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PUBLIC HEALTH REPORTS

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FEDERAL SECURITY AGENCY • Public Health Service

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frontispiece . . .

Cancer research in the past 20 years and particularly since World War II has produced notable advances in both the treatment and diagnosis of cancer, despite the fact that it has yet to provide an all-purpose cure (see page 309). One of these advances is the development of the use of radioisotopes. Shown on the frontispiece is a technician holding a plastic block containing a beaker of radioactive phosphorous, one of a number of radioisotopes under study. The plastic material is dense enough to shield the technician from harmful radiation. Phosphorous has so far been used in whole body radiation and in the treatment of polycythemia vera and certain chronic leukemias. It has also been used, with limited success, as a tracer in the diagnosis of cancer of the brain, breast, and testicle.

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Rehabilitation in the Hospital

By HOWARD A. RUSK, M.D.

IN THE PAST, the physician too often has thought only about the physiological and clinical aspects of a patient's disability. The vocational counselor too frequently has considered only the physical skills which could be utilized vocationally. Between the completion of medical care and the beginning of vocational training, however, there is a wide area through which most physically handicapped persons must go. In this area lies the physical retraining in skills necessary for carrying on the activities inherent in daily living and common to all types of work.

Except in a few isolated instances, the physically handicapped person must be retrained to walk and travel, to care for his daily needs, to use normal methods of transportation, to use ordinary toilet facilities, to apply and remove his own prosthetic devices, and to communicate either orally or in writing. These are such simple skills that they are frequently overlooked, but the personal, vocational, and social success of the handicapped person is dependent upon them.

Some outstanding rehabilitation programs in various parts of the world have demonstrated that rehabilitation to the point of self-care and even to full or limited employment is possible for many of the chronically ill who have been hospitalized for long periods. In most of our hospitals, however, the patient receives few services of this type. Hospitals complain that the chronically ill are responsible for their overcrowding, but they do little to provide the retraining services that will permit many of these patients to leave the hospital.

Dr. Rusk, chairman of the department of physical medicine and rehabilitation of the New York University-Bellevue Medical Center, New York City, is an associate editor of the New York Times and chairman of the Health Resources Advisory Committee of the Office of Defense Mobilization.

Survey of Hospital Rehabilitation Services

In 1951, the Commission on Chronic Illness in cooperation with the American Hospital Association sent out questionnaires to approximately 2,600 general hospitals of 50 beds or more to learn more about the problems of caring for long-term patients in general hospitals. Hospitals were asked if they had an organized rehabilitation service. For survey purposes "an organized rehabilitation service" was defined as a service which (*a*) studies patients with residual handicaps or disabilities due to illness or accident and (*b*) provides training and therapy to help the patient to adjust to, compensate for, or overcome the disability.

Among the first 1,600 hospitals responding, only 65 reported that they operated organized rehabilitation services. Only 18 of these reported that they had separate ward services with a specific allocation of beds for rehabilitation, and in many of these the services cannot be termed truly comprehensive. In the other 47 hospitals, rehabilitation patients were not segregated. Staffs ranged from those including full-time physicians specially trained in physical medicine and rehabilitation, physical therapists, occupational therapists, speech therapists,

vocational counselors, social workers, and others to those consisting of only a physical therapist and a social worker or a physician and a physical therapist. It was significant that 23 of the 65 hospitals reporting such services were hospitals of less than 250 beds.

Services in New York

The first comprehensive in-patient rehabilitation service in any general hospital in the United States and, to our knowledge, in the world was started at Bellevue Hospital in 1946 under the professional direction of the department of physical medicine and rehabilitation, New York University College of Medicine. Prior to the opening of this department, with a grant from the Baruch Committee on Physical Medicine and Rehabilitation, there was but one physician trained in this field on the staff of this 3,000-bed hospital. The hospital had a limited staff of registered occupational therapists, but physical therapy was administered primarily by unqualified "physical therapists" who had had little or no formal training. There were no registered physical therapists, no speech therapists, no rehabilitation counselors, no psychologists, no recreation specialists.

At present at Bellevue Hospital, there are 154 beds for rehabilitation: 69 beds for adults, 20 beds for children, and 65 beds for tuberculosis rehabilitation. At Goldwater Memorial Hospital, there are 200 rehabilitation beds; at City Hospital, 56 beds; at Kings County Hospital, 20 beds; and at Metropolitan Hospital, 30 beds.

The program will be expanded in the next 2 years by the opening of 22 beds at Fordham Hospital, which will be transferred to the Bronx Hospital Center when it opens. The number of beds at Queens General Hospital will be increased from 30 to 40, and the number at the Bird S. Coler Hospital will reach 400. The Bird S. Coler Hospital will then absorb the units now operating at Metropolitan and City Hospitals.

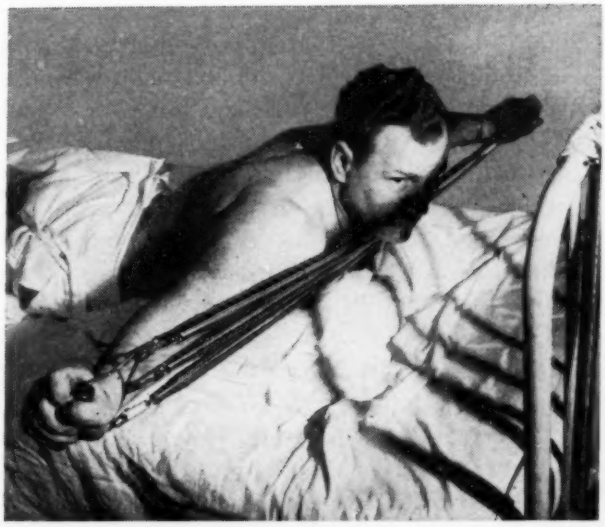
This expansion of rehabilitation services is a follow-up of the recommendations of the Hospital Council of Greater New York. In its master plan in 1947 the council suggested that 25 percent of the city's general hospital beds be allocated for convalescence and rehabilitation. This would mean one such bed for each 1,000 of the city's population.

Organization and Operation

Physical medicine and rehabilitation in these hospitals is organized as a "service" department, usually operating in relation to the other hospital services in a manner similar to that of the X-ray or the laboratory department. For example, in Bellevue Hospital the rehabilitation service provides consultants for such other major services as fractures, pediatrics, surgery, and neurology. Its resident and visiting staff regularly make rounds with the resident and visiting staff of these services. Its staff may, for example, see a patient in consultation before his leg is removed, indoctrinating him as to what he must expect, why he cannot keep his stump on a pillow, why he has to lie on his abdomen. Medical responsibility during the period of definitive care, of course, rests with the initial or admitting service. As soon as the stitches are removed, the patient is transferred to a rehabilitation ward. At this time, the rehabilitation service assumes the major responsibility for his care, fitting of the prosthesis, and training in its use. The roles are now reversed; the surgical service has become the consulting service.

Prior to actual transfer of the patient to a rehabilitation ward, however, he attends one of the rehabilitation service's semiweekly evaluation clinics, where his problem is analyzed and discussed by all members of the staff—physical therapists, occupational therapists, nurses, vocational counselors, speech therapists, social workers, and psychologists—as well as the resident and visiting medical staff. The decision as to the feasibility of transferring the patient to the rehabilitation service is then made on the basis of the service's ability to contribute to his over-all physical, emotional, social, and vocational rehabilitation.

The rehabilitation services in New York City hospitals are unique in their scope of service, for they are among the few in the Nation, other than those operated by the Veterans Administration and some specialized facilities, which provide speech therapy, rehabilitation nursing, vocational counseling and job placement assist-



ance, psychological services, and a special therapeutic recreation program in addition to medical services, physical therapy, occupational therapy, and social services.

Economic Savings

Although it is difficult to estimate the financial savings to the city of such comprehensive rehabilitation programs, the 1951 experience of Goldwater Memorial Hospital gives some indication of how much these savings may be. In 1951, the 100-bed rehabilitation unit (increased to 200 beds in 1952) in this 1,500-bed hospital discharged 168 patients, some of whom went to other institutions but 91 of whom returned to their homes. Past experience indicates that each of these patients would have stayed at least one more year in Goldwater and many would have stayed much longer. At present hospital costs, the upkeep of these patients for one additional year would have totaled $237,000.

Of the 91 patients returning to their homes, 12 were placed in full employment by the hospital's rehabilitation counselor working with other community agencies. An additional five patients were placed in part-time employment, and three were placed in sheltered workshops.

The amount listed above was not, of course, a net saving to the city, as the additional cost for physicians, therapists, and other personnel for the rehabilitation unit was about $100,000 for the year. The additional cost cannot be charged entirely to the rehabilitation program, however, since these physicians and specialists also provided definitive services for the entire hospital.

Substantial savings accrue also from the lowered cost of care for patients who, as the result of rehabilitation training to the point of self-care, are transferred to the City Home and Farm Colony. The patient-day cost at the colony in 1950 was $3.25 as compared with $7.15 at Goldwater.

Similar economic savings were made through the organized rehabilitation units at Bellevue Hospital, which discharged 264 patients; at Metropolitan Hospital, which discharged 71; and at City Hospital, which discharged 135. The human value of these services, of course, cannot be measured by money.

Further evidence that this approach pays off economically and socially can be found in the first year's experience of such a program on the chronic wards of Grasslands Hospital at Valhalla, N. Y. The original outlook for the majority of the 58 patients participating was continuous, indefinite hospitalization. Many had been in the hospital for months; some for years. At the end of the study, half of the group were walking without help and two-thirds had been discharged to their homes. Most significant was the fact that two-thirds required less than 60 days of rehabilitation training to make them self-sufficient.

Similar results have been reported at the Veterans Administration Los Angeles Center in a study of 105 patients, a typical group of elderly persons with declining or nonexistent economic potentials. All were physically disabled; a large number were chronically ill, many having histories of long periods of hospitalization prior to referral for rehabilitation. For various reasons, rehabilitation training was discontinued in 29 of the patients. Of the 76 completing their training, 34 were discharged to their homes, and the remaining 42 were transferred to the center's domiciliary unit, as they were ambulatory and capable of complete self-care.

From an economic standpoint, each of those discharged to their homes represents a saving of $15.08 per day. Costs of maintaining those transferred to the domiciliary unit were reduced from $15.08 to $3.04 per day. Based on the 1950 Veterans Administration in-patient operating costs per day, the cost of providing care for the group of 105 patients at the time of their referral for rehabilitation was approximately $1,583 per day. At disposition, the cost per day of caring for those remaining at the Los Angeles Center amounted to $378, a reduction of over 300 percent, or an annual saving of approximately $440,000.

In November 1950, a physical medicine and rehabilitation department was established at Gallinger Hospital in Washington, D. C., as a joint undertaking of the Public Health Service, the District of Columbia Office of Vocational Rehabilitation, and the District of Columbia Health Department. During the year prior to the formation of this new department, orthopedic patients spent an average of 55 days in the hospital. With the new program, the length

of hospital stay of orthopedic patients was reduced to 33 days, a saving of $122,000 for orthopedic patients alone, based on a patient-day cost of $12.50.

Experience has shown that the cost of additional specialized rehabilitation personnel largely offsets the over-all savings resulting from dynamic training programs for patients with chronic illness and rehabilitation patients who need fewer special services, such as drugs, dressings, operating rooms, X-rays, laboratory, and anaesthesia. The great saving results from the reduction in the length of hospital stay and the enabling of patients to return to lives of economic productivity or to care for themselves.

The Future

The hospital of today is being recognized more and more as the focal point in public health activities. With the changing demands being placed upon it because of the growing incidence of chronic disease and disability, it must also play a more important role in the rehabilitation of patients. In the past, hospitals have concentrated almost solely upon the definitive aspects of medicine and surgery. If the hospital is to meet the changing health needs of the public, it must assume greater responsibility for all three phases of health: prevention, definitive treatment, and rehabilitation. As Bayne-Jones has said, ". . . they must become increasingly houses of prevention instead of houses of pity." The problems of chronic disease can be met only by the creation and utilization of abilities, not merely by the building of facilities.

The Visiting Scientist Program

The Public Health Service visiting scientist program established at the National Institutes of Health has been expanded to include research workers with demonstrated ability and specialized training. The plan, which permits the visiting research workers to conduct their investigations in the laboratories at Bethesda, Md., has been formalized in preparation for the opening of the Public Health Service Clinical Center.

The visiting scientist and the research associate are the two categories of visiting investigators. Requirements for the first category are a doctor's degree or its equivalent in training and experience, at least 6 years of postdoctorate research, and demonstrated ability in a specific research problem. Research associates must have the same training and experience, but not necessarily the same degree of identification with a specialized field.

Already among the guest scientists are Nobel Prize winners Albert Szent-Györgyi, Bernardo A. Hussay, and Otto H. Warburg. The first visiting scientist to be appointed under the new program is Dr. Horace A. Barker of the University of California, an investigator in the field of metabolism.

Occupational Factors in Lung Cancer

—A Preliminary Report—

By LESTER BRESLOW, M.D.

ONE OF THE MOST striking disease phenomena of the past two decades is the sharp increase in deaths due to lung cancer. The age-adjusted mortality rate for lung cancer in the United States climbed from 2.7 per 100,000 population in 1930 to 11.0 in 1948, a more than fourfold increase.

This higher rate is not a mere statistical artifact due to improved recognition of the disease. The lung cancer rate has increased two and a half times more rapidly among men than among women. It is highly unlikely that diagnostic improvements have been applied two and a half times more completely to men than to women. Furthermore, the increasing proportion of lung cancer found as a cause of death among autopsies in hospitals also attests to a real increase in this disease (*1*).

Lung cancer has become largely a disease of men. The age-adjusted mortality rate among males in the United States in 1948 was 17.5 per 100,000 population, nearly four times as high as the female rate of 4.6. Among males aged 45 to 64 years, lung cancer caused 3.1 percent of all deaths that year (*2*). If present trends continue, it will soon exceed tuberculosis as a cause of death among males in the United States.

Dr. Breslow is chief of the bureau of chronic diseases, California State Department of Public Health. He recently served as director of study for the President's Commission on the Health Needs of the Nation.

It is reasonable to assume that some change or changes in the environment account for this phenomenon. In such a hypothesis it is necessary to take into account the fact that our knowledge of carcinogenesis in man indicates a long latent period. Hence, an increase in the lung cancer mortality rate during 1930–48 may reflect environmental changes during the period 1900–40.

Evidence has already been accumulated which indicates an association between lung cancer and excessive cigarette smoking (*3–6*). Certain occupations, especially those involving exposure to chromate ore (*7*) and radioactive minerals (*8*), have also been implicated in the causation of lung cancer. However, the number of persons with such occupational exposures in the United States is relatively small.

Collection of Data

In an effort to get further data on the etiology of lung cancer, the California State Department of Public Health has investigated the occupational and smoking history of a group of lung cancer patients and of a control group.

The first group was composed of persons with histopathologically proven lung cancer in nine California hospitals. For every cancer patient, a patient of the same age, sex, and race admitted to the same hospital at about the same time for any condition other than chest disease or cancer was admitted to the control group. Thus, the lung cancer series and the control series were equated as to age, sex, and race. They were

Table 1. Number of patients with 5 or more years' exposure in randomly selected occupations among 408 lung cancer cases and 408 controls

Occupation	Lung cancer cases	Controls
Total	98	88
Hotel and restaurant managers	5	5
Bookkeepers and cashiers, except bank cashiers	5	2
Salesmen, real estate	4	7
Bartenders	5	7
Guards and watchmen, except crossing watchmen	9	15
Animal and livestock farmers	4	5
Gardeners and grounds keepers	6	11
Electricians, skilled	6	6
Brakemen, railroad, skilled	9	3
Drillers, extraction of minerals and construction, skilled	6	2
Route men, semiskilled	9	8
Construction occupations, unskilled	30	17

also roughly equated as to socioeconomic status since both groups contained the same proportion of patients admitted to county-indigent, Federal, teaching, and private hospitals.

Each patient was questioned about the type and amount of his smoking and was asked for a detailed occupational history. The scope of the occupational data is indicated by the fact that each interview covered the patient's lifelong history, required from 1 to 3 hours, and was conducted by a qualified occupational analyst.

Analysis of Data

Preliminary analysis of the data for 408 lung cancer cases and 408 controls confirms the association between excessive cigarette smoking in lung cancer identified in previous studies.

Preliminary analysis of the data implicates several occupational exposures not previously identified. A total of 59 occupations were listed five or more times by either cases or controls, or both, with a history of at least 5 years' exposure. The 12 occupations listed in table 1 are a random selection from these 59.

The five occupations listed in table 2 were selected by the observations, first, that the number of lung cancer cases exceeded by several times the number of control cases, and second, that a common exposure among the five occupations appeared to be certain metal fumes and particles. The welders were arc and acetylene welders. The cranemen and derrickmen specified in their histories that they had worked on operations involving molten metals with consequent exposure to accumulated metal fumes. The majority of the firemen had worked in connection with either ships' boilers or industrial boilers. Although there were approximately equal numbers of miners with exposure to only gold and silver in both the group of cancer cases and the control group, the number of miners exposed to copper, lead, or zinc mining in the lung cancer group exceeded the number in the control group, indicating some association of this occupation with lung cancer. Likewise, tool dressers and drillers in oil-drilling operations appear more frequently in the series of cancer cases.

Although the numbers involved for the individual occupational groups are small, tests of significance showed that for cranemen and derrickmen exposed to metals the differences observed between cases and controls would be unlikely to occur by chance ($p<.05$) in repeated samples from the same population; for firemen (marine and stationary boilers) the observed differences also would be unlikely to occur by chance ($p<.01$).

Differences observed for welders, metal miners (copper, zinc, and lead), and tool dressers and drillers could occur by chance more frequently than the generally accepted level of statistical significance ($p.>.05$).

Table 2. Number of patients with 5 or more years' exposure in selected occupations among 408 lung cancer cases and 408 controls

Occupation	Lung cancer cases	Controls
Total	40	8
Welders	8	2
Cranemen and derrickmen, exposed to metals	5	0
Firemen, stationary and marine boilers	11	1
Metal miners, copper, lead, and zinc	9	3
Drillers and tool dressers, oil	7	2

It is extremely unlikely that the observed difference for the total group would occur by chance ($p<.0001$); hence it is deemed to be significant.

Conclusion

This exploratory study was intended merely to identify occupations that have a suggestive association with lung cancer. The five occupations shown in table 2 are of this character. These occupations and the individuals so employed should be studied intensively in order to determine the exact nature of the relationship to lung cancer.

Suggestive differences have also been noted in this preliminary analysis with respect to other occupations; these likewise deserve further study.

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Ideas

Traveling Sanitation Classes

HAWAII. Usually students have to travel to the classroom, but in the school for food service personnel conducted by the division of sanitation, Territorial Department of Health, the classroom is brought to the students.

A sanitation education representative packs up his demonstration materials and conducts the course in a restaurant if it has more than five employees. Time for class is arranged for the employees' convenience to assure attendance, but managers or owners are required to be present also. Other classes are held in neighborhood restaurants for those places employing less than five food handlers.

Each restaurant receives an official inspection sheet and a printed form for posting on a bulletin board. Any employee discovering an insanitary condition inserts the nature of the defect, recommendation for correction, his name, and date on the form. If the personnel and management are alert, and the sanitarian fails to find any defective conditions on his next inspection, the proprietor and employees win the game. Through the school and its encouragement of self-inspection, food service employees have become more conscientious about their work and are eager to seek advice, information, and suggestions.

Mercurial Diuretic Service

SHELBY COUNTY, TENN. The Memphis-Shelby County Health Department has proved the value of a nursing service for injecting mercurial diuretics into cardiac patients in their own homes. The program also affords opportunity for education in cardiovascular disease. It is planned to conserve the patient's energy and result in less frequent hospitalization and less crowded clinics.

At the present time, 65 percent of the nursing load is carried by district public health nurses. Registered practical nurses visit patients in areas where a heavy concentration of cases makes it difficult for the district nurse to assume this emergency-type service.

Each cardiac patient is carefully evaluated at an out-patient clinic prior to referral to the nursing staff. Specific written instructions on medication accompany the referral. The majority of patients receive the injections weekly although treatment intervals may vary from daily to monthly. Patients return to the clinic for reevaluation whenever necessary.

The service was initiated in March 1950 by request of the Medical College of the University of Tennessee and the John Gaston teaching hospital. A brief preliminary institute on cardiovascular diseases was held by the medical staff of the college for the health department nurses. In the early experimental phase of the project, specialized nursing service was used with the idea of gradual absorption into the general program.

By May 1952, almost 800 patients were receiving the service, and more than 22,000 home visits had been made. Under supervision, the practical nurses have handled the service well.

Venereal Disease Contact Investigation

—*A Combined Military-Civilian Program*—

By NICHOLAS J. FIUMARA, M.D., M.P.H., JACK SEGAL, M.D., and JACK JOLLY, B.S.

THE CONTROL of venereal diseases among military personnel is a joint function of military and civilian authorities. A military program aimed at the prevention and control of venereal diseases will be effective only to the degree of joint participation of the civilian and military partners. Each group must assume responsibility in certain areas, but the program should be integrated in its conception and execution. A brief review will delineate the areas of responsibility of both the civilian and military authorities.

Military Program

The activities of the armed forces may be conveniently divided into two phases—the program for prevention and the program for control of the venereal diseases.

Preventive Program

1. Education. The objective of this part of the program is not only to motivate the individual serviceman to avoid exposure but also to strengthen and reinforce his belief in the fundamental truths of decency and morality, to the end that he may retain his own self-respect, attain a mature and balanced personality, and build a sound basis for marriage, family life, and constructive community life. The character guidance program has been devised to accomplish this purpose.

2. Prophylaxis. Mechanical, chemical, and antibiotic methods of prevention are available for those servicemen who, for one reason or another, expose themselves to possible infection. They fail to appreciate the inherent limitations and effectiveness of these measures. Because of the conditions under which they are used—the inopportuneness, the messiness, the alcoholic inhibition factor, the time factor—these and many other considerations, it is imperative to de-emphasize prophylactic measures as a major part of the preventive program.

3. Measures are taken to maintain morale through effective leadership, a thorough understanding of the over-all objective of the services (why we are fighting), a fair distribution of the work, proper job placement and utilization, and adequate recreation.

Control Program

Control measures are designed to detect and treat cases of venereal diseases as soon as possible after they are contracted. The control principles used by the military authorities are similar to those used in civilian practice:

1. Screening tests through periodic examination of the serviceman.

2. Voluntary reporting to a medical officer should a serviceman suspect that he may have acquired a venereal disease.

Dr. Fiumara is director, division of venereal disease, Massachusetts Department of Public Health, and lecturer, Boston University School of Medicine; Colonel Segal is commanding officer of the U. S. Army Hospital, Fort Devens, Mass.; and Mr. Jolly is health program representative for the New England Area Regional Office, Public Health Service.

3. Contact investigation, to elicit the names, addresses, and circumstances surrounding each exposure with all contacts and with those persons exposed by the patient, within the maximum incubation period of the disease, from date of onset of the patient's symptoms to the moment treatment could be expected to be effective (*1*). Contact investigation also aims at the re-education and orientation of the patient.

Complementary Civilian Program

The civilian program, like that of the military, can be divided logically into two phases—measures aimed at prevention and at control.

Preventive Program

1. The civilian community is responsible for seeing to it that by the time an individual has reached military age, he has, through proper home training, religious instruction, and community socialization, developed a mature and balanced personality and a self-disciplined character.

2. The repression of commercialized and clandestine prostitution is the responsibility of civil law enforcement authorities (*2*).

3. The civilian community should also provide an environment, during the off-duty hours of military personnel, which is not only safe and wholesome, but which integrates the recreational and social activities of the servicemen with those of the community's civilian components.

Control Program

1. Participation of the civilian health department in the military venereal disease control program implies that the former maintains and operates an efficient and well-ordered venereal disease control program. This should include adequate case-finding, diagnostic, treatment, and case-holding procedures for the venereal diseases for the civilian population (*2*).

2. Contacts of military personnel should be investigated with dispatch. Once these contacts have been found and examined, a report of their medical disposition should be forwarded without delay by civilian health departments to the proper military authorities.

3. Military personnel who are contacts of infected civilians should be reported to the appropriate medical commands of the military services, and the results of the medical examination of the named servicemen forwarded by the military authorities to the reporting civilian agency.

4. Civilian venereal disease control officers should actively participate in the work of the armed forces disciplinary control boards to safeguard the health, welfare, and morals of armed forces personnel.

Joint Program

These, in brief, are the general duties and responsibilities of both military and civilian authorities in their joint program for venereal disease control. Failure of one of the contracting parties to live up to his end of the agreement forecasts a pessimistic future for the military control program. However, there are times when, because of the exigencies of the moment, some of the services cannot be adequately carried out. Such a situation arose in Massachusetts. The demands of the United Nations in Korea, requiring the transfer of trained and key personnel to the front, left Fort Devens without trained venereal disease interviewers. As the rotation of men continued, this lack was sorely felt. Like many military stations in the United States, the venereal disease rate at Fort Devens did not require the full-time services of a venereal disease interviewer. However, there was no question that the military venereal disease control program would profit from the services of such an individual. Therefore, the services of three well-trained nurse venereal disease epidemiologists from the Massachusetts Department of Public Health were offered and accepted. These nurses carry out a specialized program in venereal disease control and operate from venereal disease clinics located approximately 10 miles from the post. From these clinics, the epidemiologists carry out their venereal disease control activities in a given number of communities surrounding their clinics. This pattern exists throughout the State, where there are 24 clinics located in general hospitals (with 3 exceptions), each with an epidemiologist, so that complete coverage of all communities in the State is assured.

The experiences of the Fort Devens hospital since September 1951, when the services of the epidemiologists were made available, to February 1, 1952, a period of 5 months, are summarized in this paper. The station hospital still has the services of these nurses and more complete reports will be given as data are accumulated.

Methods

A simple but effective system of contact investigation has been set up. The out-patient department facilities of the station hospital at Fort Devens have been so arranged that patients referred to the venereal disease clinics or voluntarily reporting for examination are seen in the morning. After an appropriate examination, the necessary laboratory tests are performed. Reports of the laboratory examinations are ready by 1:00 p. m., in time for the afternoon clinic. Patients who were examined in the morning are requested to return in the afternoon, when, with all laboratory reports available, a definitive diagnosis can be made. Once the diagnosis has been established and confirmed by laboratory tests, the patient is interviewed by the nurse epidemiologist in a private room at the clinic. The schedule for the nurses has been so arranged that, each afternoon 5 days a week, one epidemiologist is detailed for interviewing at the clinic. Two of the nurses report two afternoons a week, and a third at one afternoon session. If no patients are examined in the morning, the nurse on call for that afternoon is notified by phone, thus releasing her for other duties.

Function of the Epidemiologists

The epidemiologists have a threefold function. Their primary responsibility is to ascertain the identity and description of contacts, as well as circumstances surrounding the exposures, for example, place and date of encounter and exposure, and relationship of the contacts to the patient. This information is given to a corpsman, who transcribes it on the military epidemiological report forms (PHS–1421 VD) and routes copies of the form to the health departments of the States where the contacts are reportedly located, or to city health departments when so indicated by military regulations.

The second responsibility of the epidemiologists, carried out during the interview, is to re-educate and reorient the patient.

Equally important is the third undertaking of the nurse, the proper indoctrination and individual training of the hospital corpsmen.

The names and addresses of all contacts are obtained whenever possible, regardless of whether they may be in Massachusetts or from other States or countries. The service is comprehensive. However, for contacts most likely to be found in Massachusetts, the nurse epidemiologists transcribe the contact data on Massachusetts forms in addition to the military reports. Copies of the Massachusetts epidemiological forms are sent directly to the epidemiologist in whose district the contact may be located, and the original copy, as well as the military forms, are sent directly to the Massachusetts Department of Public Health, division of venereal diseases. When complete identifying information is obtained, the data is immediately telephoned to the central office where it is the responsibility of the division staff to locate the appropriate nurse in the field and relay the information to her. The forms follow in routine fashion.

Such is the system which has been arranged—simple yet effective.

Results

During the period of January to August 1951, inclusive, a total of 175 cases of venereal disease was diagnosed at the United States Army Hospital, Fort Devens, Mass. There were 159 patients with gonorrhea and 16 infected with syphilis. Of the latter, 12 were in the primary or secondary stages (lesion syphilis) and 4 in the early latent stage. The corpsmen were able to elicit the names of 1.13 contacts per patient with gonorrhea and of 1.58 contacts per patient with lesion syphilis (table 1).

However, during the first 5 months of this study, September 1951 through January 1952, when infected patients were interviewed by the nurse epidemiologists from the Massachusetts Department of Public Health, division of venereal diseases, a total of 136 cases of venereal

disease was diagnosed at Fort Devens. Of this number, 113 represented cases of gonorrhea, 21 syphilis, and 2 granuloma inguinale. Of the syphilis patients, 13 were in the primary or secondary stages, 6 had latent syphilis, and 2 were in the late stages. The nurses were able to obtain 1.29 contacts per patient with gonorrhea; the contact-patient index for lesion syphilis was 3.46 (table 1).

Table 1. Results of contact investigation at Fort Devens, Mass.

Number of cases	Gonorrhea		Primary and secondary syphilis	
	Hospital corpsmen	Nurses	Hospital corpsmen	Nurses
Number of patients examined	159	113	12	13
Number of contacts named	179	146	19	45
With complete information	66	74	4	25
Percent with complete information	36.9	50.7	21.1	55.6
Found and examined	61	63	10	19
Percent found and examined	34.1	43.2	52.6	42.2
Contact-patient index	1.13	1.29	1.58	3.46
Epidemiological index	.33	.47	.17	.38
Brought-to-treatment index	[1].31	[2].44	.08	.38

[1] Includes 15 treated on suspicion.
[2] Includes 26 treated on suspicion.

Military Interviewers

Gonorrhea. The military interviewers were able to elicit identifying information on 179 contacts of the 159 patients with gonorrhea (table 1). The contact data were examined and it was concluded that complete identifying information had been obtained on 66 (36.9 percent). The information, whether complete or incomplete, was transcribed on the military epidemiological report forms and sent to the States in which the contacts were most likely to be found. As a result of the information furnished to the States, including Massachusetts, 61 (34.1 percent) of the contacts were found and examined. The epidemiological index was 0.33 since 53 of the contacts were found to be infected. When the contact information was adequate, 56.1 percent of the contacts were located and examined in contrast to the 21.2 percent who were located when the contact data were incomplete.

Lesion Syphilis. There were 12 patients with primary or secondary syphilis and the military interviewers were able to obtain information on 19 of their contacts, a contact-patient ratio of 1.58 (table 1). The contact data were deemed complete or adequate in 4 (21.1 percent) and incomplete in 15 (78.9 percent) cases. The contact information was sent to the respective States and 10 (52.6 percent) of the contacts were found and examined, 5 in Massachusetts and 5 in other States. The epidemiological index was 0.17. When contact information was complete 75.0 percent of the contacts were located and examined in contrast to the 46.7 percent who were found when the information was incomplete.

Specialized Nurse Interviewers

Gonorrhea. During the period covered by this report the nurses interviewed 113 patients with gonorrhea and obtained information on 146 contacts, a contact-patient index of 1.29 (table 1). This is not very different from the 1.13 contact-patient ratio obtained by the military interviewers, and the difference between the two is not statistically significant. However, when the adequacy of the contact data and the number of contacts found and examined are studied, one finds a significant difference, for 50.7 percent of the contact information obtained by the nurses was complete and 43.2 percent of the contacts were found and examined. The epidemiological index for all States for gonorrhea was 0.47.

Lesion Syphilis. There were 13 patients with primary or secondary syphilis and the nurses obtained the names of 45 contacts, a contact-patient ratio of 3.46 (table 1). This is in contrast to a contact-patient index of 1.58 obtained by the military interviewers. The contact data were considered complete in 25 (55.6 percent) cases and incomplete in 20 (44.4 percent). These data were sent to the various States in the routine manner and 19 (42.2 percent) were located and examined. The epidemiological index was 0.38.

Table 2. Venereal disease contacts of military personnel at Fort Devens, Mass., investigated by the State of Massachusetts and by other States

Number of cases	Massachusetts								Other States							
	Gonorrhea				Primary and secondary syphilis				Gonorrhea				Primary and secondary syphilis			
	Hospital corpsmen		Nurses		Hospital corpsmen		Nurses		Hospital corpsmen		Nurses		Hospital corpsmen		Nurses	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total cases	71	100.0	52	100.0	8	100.0	18	100.0	108	100.0	94	100.0	11	100.0	27	100.0
Complete information	10	14.1	14	26.9	0	0.0	6	33.3	56	51.9	60	63.8	4	36.4	19	70.4
Located and examined	31	43.7	37	71.2	5	62.5	11	61.1	30	27.8	26	27.7	5	45.5	8	29.6
Not infected	2	2.8	0	0.0	5	62.5	7	38.9	6	5.6	10	10.7	3	27.3	7	25.9
Infected	29	40.9	37	71.2	0	0.0	4	22.2	24	22.2	16	17.0	2	18.2	1	3.7
New case	14	-----	13	-----	0	-----	4	-----	21	-----	11	-----	1	-----	1	-----
Already under treatment	0	-----	0	-----	0	-----	0	-----	3	-----	3	-----	1	-----	0	-----
Treatment on suspicion	15	-----	24	-----	0	-----	0	-----	0	-----	2	-----	0	-----	0	-----
Not examined	40	56.3	15	28.8	3	37.5	7	38.9	78	72.2	68	72.3	6	54.5	19	70.4
Insufficient information	19	-----	4	-----	0	-----	1	-----	31	-----	14	-----	1	-----	2	-----
Cannot locate	21	-----	11	-----	3	-----	6	-----	21	-----	18	-----	3	-----	9	-----
No disposition	0	-----	0	-----	0	-----	0	-----	26	-----	36	-----	2	-----	8	-----

Conclusions

Contact interviewing is a highly specialized art requiring the services of well-trained personnel. Experiences of the Massachusetts State Health Department with the Fort Devens hospital have been very satisfactory. They suggest that other Army hospitals might well consider the advisability of a closer liaison with civilian health authorities, particularly if well-trained military interviewers are not available. More careful attention to contact investigation is needed.

Summary

This paper summarizes the basic principles of a military venereal disease control program. It emphasizes that adequate control measures must have complementary action on the part of civilian authorities. It further describes the unique experiences of a State health department in not only interviewing military patients for contacts but also engaging in the training of military hospital corpsmen in the highly specialized art of contact interviewing.

The study points up the need for highly trained personnel in carrying out contact interviewing, by comparing the results of interviewing by relatively untrained versus trained people. The hospital corpsmen who have had little training in interviewing were able to obtain 1.13 contacts per patient with gonorrhea and 1.58 contacts for lesion syphilis. In contrast, the nurses obtained 1.29 contacts for gonorrhea and 3.46 contacts for syphilis. With the information supplied by the military interviewers, civilian health departments were able to locate 34.1 percent of the gonorrheal contacts and 52.6 percent of the syphilis contacts. On the other hand, information supplied by the nurses resulted in 43.2 percent of the gonorrheal contacts and 42.2 percent of the syphilis contacts being found in spite of the fact that no disposition has been reported on 24.7 percent of the gonorrheal contacts and 17.8 percent of

the syphilis contacts as compared with 14.5 percent of gonorrheal contacts with no disposition from military interviewers and 10.5 percent for syphilis contacts.

Of striking importance was the epidemiological index. From information supplied by the hospital corpsmen, the epidemiological index was 0.33 for gonorrhea and 0.17 for syphilis. In contrast, the epidemiological indexes from information supplied by the nurses were 0.47 for gonorrhea and 0.38 for syphilis.

One of the important points brought out in this study is the obvious necessity for the States to improve their contact investigational activities (table 2).

REFERENCES

(*1*) Fiumara, Nicholas J.: Ten principles of VD contact interviewing. J. Social Hyg. **35**: 322–327 (1949).

(*2*) The Eight Point Agreement of 1948. J. Ven. Dis. Inform. **31**: 199–200 (1950).

Public Health Training Courses

In the spring of 1953, refresher training courses in the principles and practices of laboratory diagnostic methods and field training courses in insect and rodent control will be offered by the Communicable Disease Center, Public Health Service.

Laboratory subjects will include general bacteriology, enteric bacteriology, tuberculosis, virus diseases, rabies, parasitology, medical mycology, veterinary mycology, and microbiology for public health nurses. Instruction covers lectures, laboratory exercises, demonstrations, audio-visual aids, and group discussions. Laboratory training courses will be offered throughout 1953.

Laboratory personnel of State and local health departments, Federal agencies, and nonprofit institutions are eligible for the laboratory series. Applications should be submitted through the appropriate State health officer or, for Federal personnel, through the bureau or division chief, and forwarded to: Medical Officer in Charge, Communicable Disease Center, Public Health Service, Box 185, Chamblee, Ga., Attention: Laboratory Training Services. Requests for application forms and a bulletin describing the 1953 training series should be sent to the same address.

Personnel in State and local health departments and the Public Health Service are eligible for the courses in insect and rodent control. Persons from other organizations will be accepted if facilities permit. Applications should be made through the sponsoring agency to: Medical Officer in Charge, Communicable Disease Center, Public Health Service, 50 Seventh Street NE, Atlanta 5, Ga., Attention: Chief, Training Branch.

Both series of courses are scheduled as follows:

Insect and Rodent Control

March 23–April 3: Rodent control.
April 6–17: Insect control.
April 20–May 1: Rodent control.
May 4–15: Insect control.

Laboratory

March 16–27: Laboratory diagnosis of virus diseases.
March 13–27: Laboratory methods in medical mycology—cutaneous fungi (part 1).
March 16–27: Laboratory diagnosis of tuberculosis.
March 30–April 3: Laboratory diagnosis of tuberculosis (directors' course).
March 30–April 10: Laboratory methods in medical mycology—subcutaneous and systemic fungi (part 2). NOTE: Part 1, cutaneous fungi course, or equivalent education or experience, is a prerequisite.
April 6–10: Laboratory diagnosis of bacterial diseases (directors' course).
April 13–17: Laboratory diagnosis of parasitic diseases (directors' course).
April 13–17: Laboratory diagnosis of rabies.
May 4–8: Microbiology for public health nurses.

The Public Health Training Program Of New York State

By FRANKLYN B. AMOS, M.D., M.P.H.

ANY STATE health department training program naturally should be based on the needs, problems, and public health organizations existing in that State. For this reason, it is desirable to review briefly certain pertinent facts about New York.

New York State, covering an area of about 50,000 square miles, has a population, according to the 1950 census, of 14,830,192, with 7,891,957 in New York City. In addition, there are 11 other cities in the State with a population of over 50,000. There are 57 counties, exclusive of the 5 counties fully within New York City, and 929 towns, 549 villages, and 51 cities under 50,000 population. Town and city government is relatively stronger than either village government or county administration with the exception of the few counties in the State which have adopted an optional form of strong county government permitted by legislative action in the last several years. State government is well organized and many governmental services are performed by law by the State.

Local health services are provided through various administrative patterns. Each town, village, and city is required to have a health officer and may employ other public health personnel. Under permissive legislation, any county may establish a county health department, and if it does so, all towns and villages within such county become a part of the county health district. Cities within the county may and usually are included also. Fourteen county health departments are established, serving populations varying from 24,000 to nearly 1,000,000. Ten cities with a population of over 50,000 and located in counties without county health departments have full-time, well-staffed health departments. The remainder of the State receives its public health services from the employees of the towns, the villages, and the counties, supervised and supplemented by the staffs of the State district health offices, which may, in many respects, be considered as multicounty health departments.

According to a recent tabulation, there are 3,548 positions budgeted for public health professional workers in major categories, exclusive of those in laboratories and hospitals (see table).

History of Program

Since 1913, the State public health council has had authority to establish qualifications for certain public health personnel employed by the State or its political subdivisions. In 1921, the State civil service commission was established, with authority to stipulate minimum qualifications for all State employees in classified positions. Similar provisions for

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Dr. Amos, director of the office of professional training in the New York State Department of Health, discussed his State's public health training program at the training conference of Region III, Public Health Service, Federal Security Agency, Washington, D. C., on August 12, 1952.

minimum qualifications for employees of counties, cities, towns, and villages were added at a later date so that by 1945 at least minimum professional qualifications were required of all public health workers.

Full-time public health professional positions in New York State, July 1952

Professional category	Total	Employing health department		
		State	County and city [1]	New York City
Physicians	227	76	59	92
Nurses	2, 269	129	943	1, 197
Dentists	39	4	3	32
Sanitary engineers	108	52	51	5
Other sanitation personnel	762	35	316	411
Statisticians	81	25	8	48
Nutritionists	41	9	4	28
Health educators	21	7	12	2
Totals	3, 548	337	1, 396	1, 815

[1] Only the cities over 50,000 included unless part of county health department; New York City not included.

In 1932, the public health council established certain minimum qualifications for public health personnel. These included graduate academic training or practical public health experience, or both, for all full-time health officers and all public health nurses. It was felt then that provision of an adequate number of public health physicians and public health nurses to satisfy the needs demanded by these regulations could be made only by developing a State training program. Plans for a program of health officer training were developed and put into operation in 1934. Expansion of the program has resulted in the training of public health nurses since 1936, of statisticians since 1938, of nutritionists since 1945, of health educators since 1948, and of sanitation personnel since 1951. Training has been received by more than 100 physicians, 600 public health nurses, 15 statisticians, 8 nutritionists, and 20 health educators.

Present Scope

The training provided at any given time depends upon analysis and evaluation of the needs. This is done annually prior to the submission of the training budget. Some training activities have been discontinued and others decreased or increased as the needs varied.

In general, all training may be grouped in two categories:

Preservice training which may be required for the person to be eligible for appointment to the beginning permanent position.

In-service training needed for the permanent appointee to remain qualified for the position or to become eligible for a more responsible or more specialized position.

The need for preservice training is determined by position vacancies, both present and expected, by the qualifications established for the position, and by the supply of qualified applicants for the position and of the available applicants for training. Determination of the need for in-service training requires an analysis of the public health programs, both as to content and knowledge available, and the education, aptitude, and ability of the permanent workers.

The current training program includes 38 separate and distinct training activities, not including the orientation program for all new public health workers, nor the clinical training conducted as a routine function in the hospitals, nor the on-the-job training constantly in effect through staff meetings, conferences, or short courses provided wholly within the department.

Fourteen training programs are for physicians. One provides a year's supervised experience and residency training approved by the American Board of Preventive Medicine. Another permits physicians to be sent, on stipend, to an approved school of public health for one academic year. Tuberculosis public health physicians are trained in a 14-month program which includes 6 months' clinical training in a tuberculosis hospital, 2 months' general experience in public health, and 6 months' specialized experience in tuberculosis control. Physicians may be trained for maternal and child health positions for a year at a school of public health supplemented by 6 months' planned experience in a local health department. One year of clinical training in tuberculosis is given to physicians to qualify them for beginning clinical positions in the State health depart-

ment. Specialized training in rheumatic fever includes 1 year of clinical experience supplemented by a year in a school of public health. Training for physicians in laboratory work consists of 1 year of practical experience under close supervision which, when added to the qualifications the physician must have to enter such training, permits him to meet the requirements for director of a local laboratory. Clinical training in cancer, heart disease, or cerebral palsy can be given to physicians not employed by an official health agency but who will subsequently be contributing to official health programs. Short, formal courses in public health administration varying from 3 days to 2 weeks are provided for public health physicians. Short courses in clinical subjects such as poliomyelitis, tuberculosis, cancer, or heart disease are also arranged for this group.

The department aids in providing postgraduate medical education for the 30,000 private practitioners in the State in several ways. In a cooperative program with the State medical society, honorariums are paid to lecturers at local medical meetings and special short courses are arranged on the subjects of rheumatic fever and rheumatic heart disease, cardiovascular diseases, pediatrics, and obstetrics. In a joint program with the University of Buffalo School of Medicine, comprehensive postgraduate medical education is provided.

The provision of practical public health experience for a limited number of medical students is another important activity. Known as the junior public health intern program, it accepts 30 of the State's 900 medical students for 1 to 4 months' training. The students work under the immediate supervision of a well-qualified public health physician in the State health department or in a selected local health department. Their public health training is comparable to the clinical training at hospitals they receive while in medical school.

The single training program for dentists consists of a 2 weeks' course in children's dentistry for practicing dentists in the State.

Twelve of the training programs are for nurses. One consists of 6 months' supervised field experience with a general public health nurse. Another is an academic year in public health nursing, which leads to qualification as public health nurse for field service. Further academic training of 1 year is provided for nurses who will be responsible for supervising or directing other public health nurses. Training in the care of premature infants and the newborn, in pediatrics, in cancer, in tuberculosis, or in physical therapy is given to public health nurses or nurses employed by other health agencies and by hospitals.

Short courses for nurses, consisting of 4 weeks or less of academic or clinical instruction, observation, and training, are also provided in several specialized subjects. Nurses may be sent for a 3 weeks' course in contact investigation in venereal disease. Two months' experience in public health is provided for student nurses from the schools of nursing whose graduates are then qualified as public health nurses for field service.

One program for nutritionists provides a 12-month apprenticeship under the guidance and supervision of a public health nutritionist.

There are three programs for public health educators. One provides supervised field experience for 1 year, and another provides for sending these trainees to schools of public health. Short courses in health education techniques are made available for health educators in the State. One training program for statisticians sends them to a school of public health for an academic year. Six programs are for groups of sanitation personnel. One program for public health engineers and sanitarians consists of short courses of 1 to 2 weeks' duration in such subjects as epidemiology, public health administration, and public health education.

A 1 to 2 weeks' course is conducted to qualify water and sewage treatment plant operators. A 2 weeks' course is offered at least once each year for dairy and milk inspectors. A 12 weeks' course for sanitary inspectors is given jointly by the State health department and the Public Health Service in a field training center at Yonkers. Other shorter courses for sanitary inspectors are also given at this school. Short courses lasting from 1 day to 1 week are given for employees and operators of camps, restaurants, swimming pools, and similar facilities. There is no provision at present for full-year academic training in the school of public health for public health engineers and sani-

tarians, but this is the next step planned for the development of the sanitation training program, which has been in operation for only 1 year.

Three training programs are for technicians. One consists of a year's training in photofluorography. Two others of short duration are for laboratory technicians.

This listing of public health training given shows the present scope of the program. It is not exactly the same as it was in 1951 nor as it will be in 1953, but it shows the variety of content included and method of providing training.

Administrative Organization

Training is a vital part of public health administration. As such, it must be carried out by many people in administrative positions, including those in the local health departments as well as those in the State health department. Various schools, of course, also have an important part in providing adequate training for public health workers.

The administrative organization of training within the State health department is the result of evolution over the 18 years it has performed this function. Naturally, the training for any specific group of personnel can be done best by those providing service in that category; therefore, as new training programs were added, units were established within the appropriate division, bureau, or office to conduct the training of the members of that unit. As the training function of the department began to assume major proportions, it became evident that an office to integrate and correlate the training activities was needed. In 1948, the office of professional training was established as a part of the executive division and was delegated this responsibility. There was continued recognition of the need for providing training within the service units, however, and one or more professional workers in many of these units are today devoting full or part time to the administration of the training programs outlined.

The immediate staff of the office of professional training consists only of the director of the office and necessary stenographic assistance. Three nurses give full time to a training unit in the bureau of public health nursing and one sanitary engineer devotes full time to a training unit in the bureau of environmental sanitation. In addition, one person in the office of health education, one in the division of medical services, one in the bureau of nutrition, one in the office of vital statistics, one in the division of laboratories and research, and two in the division of tuberculosis control devote part time to training activities.

Unification of training functions, including the common utilization of training facilities, determination of uniform policies and procedures, and equitable distribution of funds, is accomplished by frequent conferences among the members of the department who have a primary responsibility for professional training activities and by a regularly scheduled monthly meeting of all these persons. Reports to the commissioner of health on training policies and procedures and the training budget are submitted through the office of professional training. These reports and the budget represent the combined thoughts, interests, and needs of all persons concerned with training.

Budget Provisions

Adequate budgetary provisions are essential for the conduct of public health training programs. This year, the State health department has a training budget of $624,495. Of this amount, $252,000 is a State appropriation and the remainder is allocated from Federal funds. Salaries of a few of the people devoting full time to training are included in this budget, and the remainder is for the payment of stipends, travel expenses, and tuition for trainees. Other items of training expense not included in the training budget are the salaries and expenses of the many persons doing training on a part-time basis, the production of materials, and incidental items of expense incurred in connection with training. These are absorbed in the regular budgets.

Stipends of trainees are determined according to a formula which is acceptable to both the health department and the budget director's office. This formula provides that persons in preservice field training be paid 75 percent of the beginning salary of the position for which

they are training, those in academic preservice training who have dependents, 65 percent of the beginning salary, and those who have no dependents, 50 percent; those in in-service academic training, 80 percent of their salary at the time they go on leave of absence if they have dependents and 60 percent of such salary if they do not have dependents.

Typical Training Program

A description of the health officer training program will show the general pattern of all programs.

Advisory Committee

Seven members compose the advisory committee for the health officer training program. The deputy commissioner, the assistant commissioner for local health services, and the director of the office of professional training serve ex officio. Other members are the dean of a medical school, a county health commissioner, the assistant State commissioner of education, and the executive director of a voluntary health agency. The latter was formerly director of a school of public health, and if this were not so there would be an additional member representing that field.

The committee has no executive function but advises on policy and procedural matters. It meets regularly to consider qualifications of applicants, length of training, content of training, educational methods employed, or specific problems arising from time to time. Although the committee has no authority of direction, the advice given is usually decisive in future action.

Trainee Qualifications

Trainees must be graduates of an approved medical school; must have interned 1 year in an approved hospital; must be United States citizens or give assurance that they will be citizens upon completion of their training; must be licensed to practice medicine in the State or have reasonable expectation of being licensed upon completion of training; and preferably should be not over 35. The citizenship and license requirements are necessary to qualify for permanent appointment. The age requirement is not absolute, but exception is made only under unusual circumstances. Experience has shown a more probable expectation of success both during and after training for those who enter the field of public health early in their professional careers.

Selection

Applicants with the qualifications outlined are interviewed by a committee composed of three members of the State health department. Agreement on the suitability of a candidate must be unanimous before he is accepted for training.

Content

The training consists of the two parts previously listed as separate training programs: a year's residency training, and an academic year at an approved school of public health. A part or all of the residency training must be completed prior to attending the school of public health if such attendance is on stipend from the State health department. Usually, the minimum period which must be completed is 6 months, a requirement serving a threefold purpose: It permits the physician to determine whether public health is the field he wishes to enter; it permits the State health department to evaluate the physician before committing itself to financing the academic training; and it gives the trainee a background for attending a school of public health.

Representatives of the schools have concurred that such training is necessary for physicians not otherwise possessing some public health experience if they are to receive the maximum benefit from their academic experience.

During the first 6 months of the residency program, the physician follows closely a guide for residency training, which outlines the experiences in all phases of public health practice that he will likely encounter when he accepts a position as health officer. During the second 6 months, the resident serves as an assistant to a county or city health commissioner or district health officer, performing designated duties under close supervision.

The residents are brought into the central office in small groups for three 1-week periods

for orientation in the State health department state-wide programs, procedures, and policies. Several short group courses or experiences are arranged for the residents. These consist of clinical training in certain acute communicable diseases or tuberculosis, cancer, or heart disease. Once each month, all of the residents, together with the physicians with whom they are working, meet with the director of the program. At this time, ideas and experiences are exchanged, and instruction is given in such subjects as elements of supervision, parliamentary procedure, public speaking, legal responsibilities, office practice, and budgeting.

Reports and Review

The progress of each trainee is followed very carefully during both field and academic training. During field training, reports are received from the preceptor at semimonthly intervals and from the resident at monthly intervals. These are supplemented by at least monthly conferences of the director of the program, the trainee, and the preceptor. At the time of appointment, the resident understands that his progress must be satisfactory during the first 6 months if further training is to be given. At the end of 6 months, commitment is made on both sides to complete both the field and academic training, and the school to which the trainee will be sent is selected.

Stipends

The resident public health physician receives $425 per month; the physician with dependents who is attending school, $368 per month; and the physician without dependents who is attending school, $283 per month. In addition, all office and other business expenses, travel expenses for the trainee when he is in the field or going to and from the school of public health, and tuition and other academic expenses are paid by the health department.

Commitments

Inasmuch as the number of physicians selected for training is based on the need for physicians in the State, the health department agrees to offer a position to the trainee when training is completed. The trainee agrees to accept a position in public health in New York State and to serve in public health within the State for a period equal to his period of training. He may be offered a position in one or more of the counties or cities as well as in the State health department. In this event he is free to accept the position of his choice.

Results

One hundred and forty physicians have entered the training program since it began in 1934. Ninety-six have completed their training and become qualified health officers in New York State; 8 are now in training. Of the remaining 36, many discontinued voluntarily and a few by request.

Of the 96 who have completed the training, 45 are now in official public health positions in New York State, and 17 are known to be in official public health positions in other States or in the Public Health Service. Eleven have accepted positions in organizations or schools where their work is of prime public health importance. Thus, a total of 73 of the 96 are presently working in public health. Eleven physicians are known to have returned to private practice; three are deceased; one is permanently disabled; one is retired; one is in the Army; one is in the Veterans Administration; and the whereabouts of the other five is unknown.

Summary

Training is a major and vital function of public health practice. Prior to the development of a training program, a careful analysis of the training needs must be made. Only a small full-time staff is required to administer the program, but the conduct of the training must be considered a function of a large number of the public health workers who are giving direct service to the communities. Provision must be made for adequate funds to pay stipends and other expenses, as well as to insure that sufficient time is available for the administration and conduct of training without interference with service duties. Training needs must be constantly re-evaluated and the training program revised to meet these needs if maximum results are to be obtained.

Tennessee Accident Fatalities, 1946–50

By ANNA LOVE SULLIVAN, B.S.

ACCIDENTS caused the deaths of 9,095 residents of Tennessee during the 5 years 1946–50, or an average of 1,819 deaths per year. In this same period, accidents were the fourth principal cause of death in Tennessee for persons of all ages.

When considered by age groups, however, accidents were found to be the leading cause of death for persons 1–24 years, the second principal cause of death for persons in the age group 25–44, and the fifth principal cause for all persons 45 years of age and over. (See fig. 1.)

Motor vehicle accidents outnumbered all other types of accidents in Tennessee for the 5-year period under study. The number and percentage of deaths by type of accident are shown:

Deaths From Accidents by Type (1946–50)

Type	*Deaths*	*Percentage*
Motor vehicle	3,437	37.8
Home	3,072	33.8
Other public	1,821	20.0
Occupational	565	6.2
Other	200	2.2
Total	9,095	100.0

For Tennessee residents in the 1–24 age bracket, accidents caused more deaths over the 5-year period than did the other five leading causes of death combined. In this age group, accidental deaths numbered 2,739, while the total number of deaths was 2,687 for the next five leading causes of death—tuberculosis (second), influenza and pneumonia (third), malignant neoplasms (fourth), diseases of the heart (fifth), and homicides (sixth).

During 1946–50, 1,547 children under 15 died from all types of accidents, an average of 309 deaths for each of the 5 years.

The death rates according to type of accident resulting in death varied according to age. In young adults, the motor vehicle accident rate was very high, followed by a slightly lower rate for the age group 30–54 years. But these lower rates were followed by higher rates for persons 55 and over. For the age groups between 15–64 years, death rates from motor vehicle accidents were higher than were the rates for other types of accidents.

Home accidents caused many deaths in children below 10 years and resulted in a very high rate in old age. Occupational accidents caused approximately six deaths per 100,000 population per year for those 25 years of age and over.

Motor Vehicle Accidents

During 1946–50, on the average, 687 deaths per year from motor vehicle accidents were recorded. The trend of death rates since 1914 shows that deaths caused by motor vehicle accidents increased steadily until 1936, from the 1914 rate of 1.6 deaths per 100,000 population, to 27.9 in 1936. The high rate of 1936 was followed by lower rates, which are attributed to the restricted use of cars during World War II. Accident death rates since 1946 have again had a steady increase, reaching the rate of 25.9 in 1951.

Miss Sullivan is a statistician in the statistical service of the Tennessee Department of Public Health.

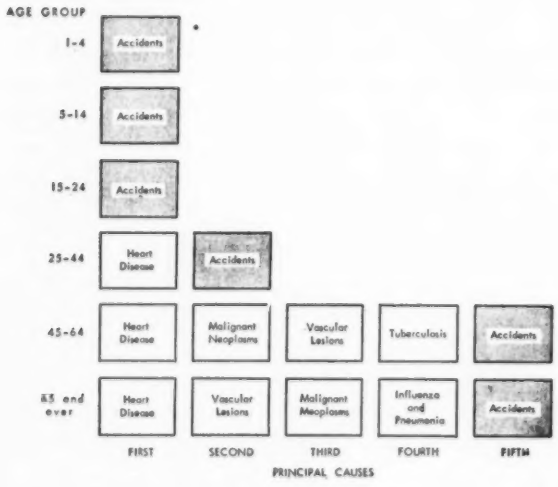
Collisions with other motor vehicles caused many accidents. Deaths from this type of accident numbered 965 or 28.1 percent of all motor vehicle accidents. Collisions with pedestrians caused 939 deaths (27.3 percent). Noncollision accidents killed 906 persons (26.4 percent), and other and unspecified motor vehicle accidents numbered 627 (18.2 percent).

The death rate for drivers was very high in the 10–34 age group, with the highest rate in the 15–24 group, indicating the need for accident prevention education in high schools. Accident death rates were very high for male drivers, higher than the rates for female drivers in all age groups.

The passenger death rate was also very high in the 15–24 age group. For pedestrians, the death rates were high in the older age groups with very high rates for males 65 and over.

The average annual death rates per 100,000 population by age and sex reveal a higher death rate for males in all age groups, with the highest rate (58.0) in the 15–24 age group. The next highest rate is that of males 65 and over. For females, the highest rate (14.3) occurs in the same age group, followed by the rate of 12.1 for the 55–64 group. Females 15–24 years of age had a rate of 11.6.

Figure 1. Relationship of accidents as principal cause of death to other causes, by age, Tennessee, 1946–50.



On the week end, the daily occurrence of accidents was higher than at any other time. The week-end increase started on Friday with 439 deaths (13.7 percent) occurring. The number was greatest on Saturday (23.2 percent) and decreased to 18.0 percent on Sunday. Fewer accidents occurred on Tuesday, Wednesday, and Thursday, with a low of 10.4 percent on Thursday.

Average annual death rates per 100,000 population from motor vehicle accidents were also studied by counties for 1946–50. Very high rates were noted for 35 of the 95 counties in Tennessee. Davidson County, in which Nashville is located, had the highest rate (24.0) of four Tennessee counties (Davidson, Hamilton, Knox, and Shelby), containing the four largest cities. Shelby had the lowest rate, 15.9.

Home Accidents

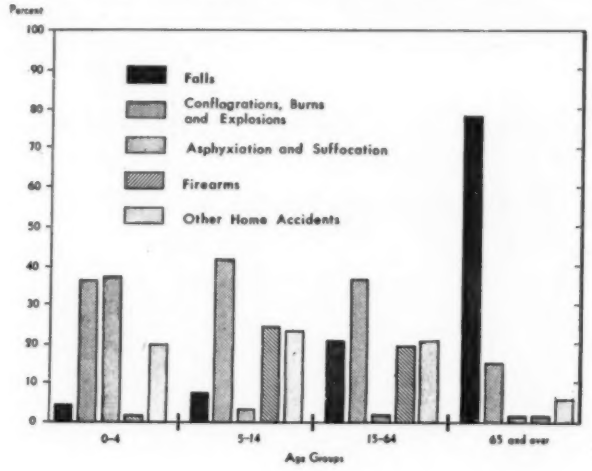
Although persons of all ages are exposed to hazards in the home, the highest death rates from home accidents were found in the two age groups, under 5 years, and 65 and over. Falls were the most frequent cause of home accident deaths. Of the 1,332 deaths (43.4 percent) from falls, 1,124 (84.4 percent) of all falls occurred in the age group of 65 and over. Con-

Useful Application of Data

That an aggressive program of accident prevention would help to save some lives is apparent from any study of routine accident data. Through dramatic use of accident statistics, the health department can inform members of its community about the needless tragedies caused by lack of caution in the home and on the highway.

Tennessee is doing just this. The accompanying paper is one illustration of how accident statistics can be usefully applied. Another illustration is the release in 1952 of a 20-page pamphlet "Stop Look Listen—Prevent Accidents" by the Tennessee Department of Public Health. The fatality statistics presented in this issue are a slight abridgment of the information contained in the pamphlet and reported in March 1952 to the Tennessee Public Health Association.

Figure 2. Fatal home accidents by type and age group for 5 years, Tennessee, 1946–50.



flagrations, burns, and explosions came next with 818 deaths.

Accidental deaths from firearms were noted for all ages. Twelve deaths were those of children under 5; 53 deaths were in the age group of 5–14. For adults 15–64 years of age, 154 deaths were recorded.

Of the 818 deaths from conflagrations, burns, or explosions in the home, 439 were the result of fatal burns and explosions other than in a burning building. Many deaths (79) were caused by burns from open grates; half of these (39) were of persons in the age group 65 and over; and 14 were of children 0–4 years. Explosions caused 69 of the 439 deaths with the largest number occurring in the 25–44 age group. Scalds killed 53 with 19 deaths occurring in the age group 65 years and over. Burned fatally by stoves were 25 children under 5 years. The age group 65 and over had more deaths (140) of the total 439 than did any other age group. A total of 101 deaths, the next highest number, occurred to children 0–4 years.

For children under 15, over half of the 1,547 deaths from all types of accidents (866 or 56 percent) were from accidents in the home. There were 647 deaths of children under 5. Conflagrations and burns accounted for 233 deaths—asphyxiation and suffocation for 244.

Other Public Accidents

Many fatal accidents occur every year in public places. In Tennessee, there were 1,821 such deaths in the 5 years studied from other than motor vehicle accidents. They have been tabulated by transportation and nontransportation, and by type of accident.

Of the 608 deaths caused by transportation other than motor vehicles, 248 were from railroad accidents where no motor vehicles were involved, 181 were due to water transportation accidents, and 146 to air transportation.

Drownings occurred more frequently in June and July than in other months and caused 620 deaths in the 5-year period.

Occupational Accidents

Industrial or occupational accidents are defined as accidents arising out of or occurring in the course of gainful employment exclusive of injuries to domestic servants and to persons involved in public transportation accidents. Tennessee had 565 occupational accident deaths in the period studied.

Leading in occupational accidents were agricultural accidents. Of the total 565 fatalities, there were 152 accidental deaths in agriculture, an average of 30 per year. Ninety-seven deaths (a yearly average of 19) occurred in employment in transportation and public utilities; and 90 deaths (an average of 18 per year) in mining and quarrying industries. Manufacturing industries had the lowest number, 71—a yearly average of 14.

Reactivity of VDRL Antigen Suspensions Made at Various Temperatures

By PAUL FUGAZZOTTO, Ph.D.

WHENEVER a study is conducted to evaluate the performance of serologic tests for syphilis, the final analysis usually reveals a considerable "spread" in the levels of sensitivity and specificity attained by the participating laboratories, irrespective of the test procedure or the kind of antigen employed. As a matter of fact, wide differences in results are obtained even when all participants use the identical test material in the same test procedure. For example, in a recent National Serologic Laboratory Evaluation all interested participants were given the same VDRL test material to use in the studies. When the results were tabulated it was evident that the reactivity levels shown for the VDRL test varied to essentially the same degree as those shown for other test procedures in which few if any of the participants used the same test material. It appears, therefore, that the reproducibility of serologic test performance is dependent upon the standardization of other factors (besides the antigen) which have not been well enough defined in the literature, and which are therefore poorly or insufficiently controlled in practice. Experience has shown that environmental temperature ("room temperature" so called) is one such factor.

The present work was undertaken to obtain data on the effect of variations in environmental temperature on the physical appearance and reactive nature of a flocculation test antigen suspension.

Dr. Fugazzotto is the chief serologist in the bureau of laboratories, Indiana State Board of Health, Indianapolis.

Method

The VDRL test was used for this study. In order to avoid features involving differences of opinion, it seemed well to keep the study as objective and tangible as possible. To avoid further complications in interpretation of results, the study was limited to temperature variations introduced only at the point in the procedure where the saline-antigen suspensions are prepared. To simulate conditions comparable to variations in room temperature, all the materials required for preparation of the suspensions (except the antigen) were placed in the refrigerator or in the incubator for periods of time sufficient to impart different temperature levels to them. (The bottle of VDRL antigen was left in the environment of the laboratory: 22.4° C.) Using these various materials and following the stipulations set forth in the serologic test manual (*1*), 10 saline-antigen mixtures were made. Immediately after each suspension was made, a thermometer was placed in the solution to determine the temperature of the resulting antigen suspension. These values were recorded, and for sake of convenience were designated as "suspension temperatures." Then the suspensions were allowed to establish equilibrium with the temperature of the laboratory (22.4° C.) before they were used in the comparative tests. From this point on, meticulous care was taken to as-

Table 1. Comparative sensitivity of VDRL antigen suspensions prepared at various "room temperatures"

[Tests with pooled reactive serum in series dilution]

Antigen No.	1	2	3	4	5	6	7	8	9	10
Suspension temperature, ° C.	15.3	18.2	19.4	21.2	21.8	22.7	23.6	24.8	29.6	37.0
Serum dilution	Plus readings									
1:4	2	3	3′	4	3′	3	3	3	2′	1′
1:8	1	1′	2	2	2	2	1′	1′	1	±
1:16	±	1	1	1	1	1	1	±	±	—
1:32	—	±	±	±	—	—	—	—	—	—
1:64	—	—	—	—	—	—	—	—	—	—
Total pluses	3. 5	6. 0	7. 0	7. 5	6. 5	6. 0	5. 5	5. 0	4. 0	2. 0

Note: The mark (′) denotes a reaction slightly stronger than the plus reading shown.

sure identical treatment of the reagents. The serologic test results were read by a well-trained technician who had no previous knowledge regarding the nature and purpose of this study. The recordings were made in terms of pluses for convenience of comparison.

Results

The suspension temperatures, as observed and recorded immediately after preparation of the suspensions, ranged from 15.3° to 37° C. (table 1).

The first step in studying these preparations consisted in an examination of the suspensions themselves. To several chambers of a Kline test slide there was delivered 0.05 ml. of VDRL buffered saline. One drop of each antigen suspension was dispensed into a separate chamber of this slide, the slide was tapped gently to disperse the particles, and the material was examined under the microscope. The slide was then placed on a conventional agitating machine at 180 rotations per minute for 4 minutes, and the material examined again.

In this series of suspensions there was a wide range in particle size: very fine pinpoint at the low temperature extreme to very large needle-like particles at the high temperature extreme. With the exception of suspension No. 10 (in which the very large particles had a tendency to become entangled on agitation) there was no appreciable change in the appearance of the material on the slide after the 4-minute agitation.

The next step in the study of these suspensions was to test their sensitivity to reactive serum. For this purpose, a mixture of reactive serums was prepared; a series of saline dilutions was made by the double dilution method, and these dilutions were tested simultaneously in the usual manner with all 10 antigens. In table 1 are given the results obtained with each antigen on each dilution of serum.

Glancing over these results, we can see a definite reactivity curve having a peak in sensitivity at the level of antigen No. 3 or 4. The totals of the pluses shown at the bottom of the table are not necessarily significant in themselves, but are given as a means of expressing the sensitivity curve. As indicated here, the sensitivity was greatest for the antigen prepared to have a temperature of 21.2° C.

Finally, comparative tests were done on a group of 36 routine clinical specimens. These specimens were selected because they were weakly reactive in the Mazzini test. For this work, only 5 of the 10 suspensions were used.

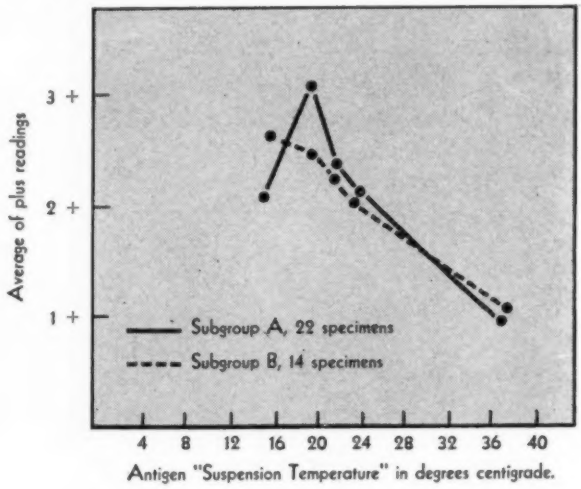
On analyzing the results obtained with this group of 36 specimens it was found that the data could be divided into two subgroups because of the two reaction curves represented (see chart): subgroup A, in which the paraboloid type of reaction was displayed, and subgroup B, in which the reaction seemed to be the semiparaboloid type. In order to show the uniform pat-

tern of reactivity displayed by this series of antigen suspensions when used on individual test serums, the entire protocol, separated accordingly, is given in table 2. The totals and averages of the pluses are also given as an expression of the over-all picture.

The reaction curves are better illustrated by the chart, in which the average plus readings (shown for both subgroups in table 2) are plotted against the respective "suspension temperatures."

The fact that the curves in the chart show a difference in elevation can only be considered a coincidence. On the other hand, the difference in the scope of the curves seems to be due to the nature of the serums under test. Irrespective of the type of reactive specimens involved, however, there was an obvious decrease in sensitivity of the suspensions as the "suspension temperatures" became elevated (above 22° or 23° C.). In addition to this, the suspensions prepared at the higher temperatures were rather coarse and more difficult to evaluate. Suspensions such as No. 10 would definitely be considered unsatisfactory, even by the inexperienced technician.

Variation in the sensitivity of VDRL antigen suspensions and temperature at which the saline-antigen mixtures were made.



Discussion

In considering the effect of temperature on serologic tests we must not fail to recall the work of Kahn, who has long shown with one form of "verification test" that, irrespective of its diagnostic value, differences in reactions are very often obtained under different environmental temperatures. All syphilis test antigens in present use are derived from essentially the same material and, whether we realize it or not, as long as one serologic test procedure is affected by environmental temperature, any procedure we may choose to employ is bound to be similarly affected. The only difference between the above-mentioned verification test and routine serology is that in the former each serum is tested in triplicate and the effects of various temperatures on the colloidal-chemical reaction can be seen side by side. In routine serology a given procedure is applied under only one undetermined and uncontrolled set of environmental temperatures and conditions. No comparative effects are seen; and there is no assurance that the test results would be duplicated on another day, or in another laboratory.

The philosophy advanced here is that "room temperature" is not a standard, designated by any particular line on a thermometer. The term itself serves only as a means of making the distinction between the main bulk of the laboratory space and the controlled thermal equipment, such as the refrigerator, incubator, and autoclave. It designates a place more than it does a condition. The thermometer reading in that place can vary over wide limits, and the fact that we ignore this in our routine work does not prevent it from exerting its influence on the test. Normal room temperature may range anywhere from near 0° C. to above 37° C. depending on the season of the year, geographic location of the laboratory, position of the room in relation to the rest of the building and the points of the compass, presence or absence of large electrical and steam equipment, air conditioning, windows, and many other features. Furthermore, it may vary on any one day from place to place in the room and from time to time. Reagents kept in such a laboratory must be expected to have the temperature of their immediate environment: cooler near the floor, warmer higher up. In winter they will be cooler in a cabinet on an outside wall, warmer in a cabinet on an inside wall—vice versa perhaps in the summer.

A good example of the type of situation that

Table 2. Comparative sensitivity of VDRL antigen suspensions prepared at various "room temperatures"

[Tests with selected clinical specimens]

Subgroup A						Subgroup B					
Antigen No.	1	3	5	7	10	Antigen No.	1	3	5	7	10
Suspension temperature °C.	15. 3	19. 4	21. 8	23. 6	37. 0	Suspension temperature °C.	15. 3	19. 4	21. 8	23. 6	37. 0
Serum No.	Plus readings					Serum No.	Plus readings				
1	3	4	4	3	2′	3	3	3	2′	2	1
2	2′	3	3	1	1	6	2	2	1′	1	±
4	2′	3	2′	2	2	7	2′	2′	2	2	1
5	±	1	±	—	—	8	2′	2	2′	2	1
9	1	2	2	1	±	10	1	1	1	1	—
12	1′	2	1	1	—	11	2′	2′	1′	2	1
13	2	3′	2′	2	1′	16	2′	2′	2	2	1
14	3	3′	2′	NT	NT	17	2′	2	2	2	1′
15	2′	3	2′	2	1	18	3	2′	3	2	1
19	1′	2	1′	1	±	20	4	3	3	2′	1
21	2	3	3	2′	1	26	2	NT	1′	1′	±
22	2′	3	3′	3	1′	27	2	2	2	1′	±
23	1′	2′	1′	1′	±	29	4	4	4	4	2′
24	1′	2	2	1′	±	32	3	3	2′	3	2
25	2′	3	2′	2	1						
28	2	2′	2	1′	±						
30	2′	3	2′	2	1′						
31	3′	4	3′	3′	2						
33	1	1′	2	1	±						
34	2	2′	2′	1′	±						
35	3	4	3	2′	1						
36	2	3′	2′	2′	1						
Total pluses	46. 0	61. 5	52. 3	39. 0	20. 5	Total pluses	36. 5	32. 0	31. 0	28. 5	14. 5
Average	2. 09	3. 07	2. 38	2. 04	0. 97	Average	2. 61	2. 46	2. 22	2. 02	1. 03

NOTE: The mark (′) denotes a reaction slightly stronger than the plus reading shown. NT=Not tested.

actually obtains in laboratories is illustrated by an experience in a rather large, air-conditioned private laboratory which had a room temperature of 23° C. (75° F.) on a day when the out-of-doors temperature was −10° C. (14° F). The temperature in the cabinet hanging against an outside wall and containing the glassware, saline, and antigen was 8° C. (46° F). While the materials were used in the room at 23° C., the temperature of the reagents did not at all approach that of the room when the antigen suspension was made, not to mention the fact that the antigen itself had in reality been refrigerated for at least one period of approximately 12 hours prior to its use. Yet the technician considered his work satisfactory; he had complied with the instructions in the literature and had been using the material at room temperature.

The data given in this report are not presented to specify the suspension temperature at which the VDRL test antigen suspension should be made; for in the first place, the optimum suspension temperature might well differ for each alcohol preparation of the material (a phase which has not yet been studied); and second, the incorporation of such a stipulation in the test procedure is a matter for the consideration of the test authors. This report is intended only to record the observation that differences in the appearance of the microscope field as well as differences in sensitivity could be demonstrated to result from controlled variations in room temperature even though the variations were affected for only one of the many phases in test procedures where temperature can and does vary in actual practice.

The resulting differences in sensitivity of the antigens studied may not appear especially startling; and perhaps for practical purposes such variations can be considered negligible. However, if we carefully study serologic test procedures from the standpoint of the numerous combinations of conditions under which differences in temperature and other factors can easily be introduced, without violating the instructions given in manuals of procedures, we can readily understand that to a great extent inconsistencies in results are without doubt due to the "negligible" effect of one variable superimposed upon that of others.

The effects of all the negligible features are just as important to that serologic summation which we call the serologic test report, as seconds are to the accumulation of time.

Conclusions

Since temperature influences the colloidal make-up and behavior of syphilis test antigen suspensions, and since the temperature can be controlled for certain phases of serologic test procedures, the optimum temperature range for these phases should be determined and specified in the literature. The term "room temperature" has little or no meaning from a scientific standpoint, and should be deleted from serologic test descriptions.

Summary

In a laboratory with a "room temperature" of 22.4° C. it was possible, under controlled conditions, to prepare antigen suspensions under conditions of temperature ranging from 15.3° C. to 37° C. With the use of these antigens (brought to a room temperature of 22.4° C.) data were obtained showing that the microscopic appearance and the sensitivity of a flocculation test antigen suspension (VDRL) are in a degree determined by its temperature at the time it was made.

This report is offered as an indication that environmental temperature is one of the factors contributing to wide variations in serologic test performance.

REFERENCE

(1) U. S. Public Health Service: Manual of serologic tests for syphilis. Supplement No. 22, J. Ven. Dis. Inform., 1949.

Dr. Foard Retires

Dr. Fred T. Foard, chief of the branch of health, Bureau of Indian Affairs of the Department of the Interior, retired as an officer of the Public Health Service on October 31, 1952, after 36 years of service. He is now director of the division of epidemiology for the North Carolina State Department of Health.

Dr. Foard began his public health career by assisting in control of malaria, typhoid, and other environmental diseases in the West and Southwest. In 1920 in Montana he organized the first full-time county health unit in the Rocky Mountain tier of States, and assisted health officers in 10 other western States to organize district and local units when funds became available under the Social Security Act.

Recent Progress in Cancer Research

By JOHN R. HELLER, JR., M.D.

THE MANY recent advances in cancer research make possible the cure of more cancers today than 20 years ago. Unless the cancer is far advanced, modern surgery or radiation, or a combination of the two, now offers the patient a greater opportunity for survival. There is also a better outlook for patients with advanced cancer who may be beyond the hope of permanent cure. New palliative measures have been developed which may prolong lives in comfort and increase their usefulness. All of this is possible even though knowledge of the etiology of cancer is slight, and an all-purpose cure for cancer's many forms is lacking.

The fact that one can regard cancer in such an encouraging light is highly significant, for the concerted attack against it is relatively new. Modern cancer research goes back about 50 years, but only since the end of World War II have significant sums of money been available for this purpose. Support and coordination of research are now being provided on an unprecedented scale, and many of the ablest investigators in the Nation are teamed in an effort to conquer cancer.

Nonetheless, cancer poses a dilemma which few other diseases can match. It is a complex public health problem because in cancer we are dealing not with a single disease, but with many diseases. The more data that are accumulated in the research laboratories, the more there appears to be learned about the cancerous process, its growth, and its control. The multitude of new approaches that have come to light seem to branch out into an almost infinite number of ideas. There appears to be an endless amount of knowledge which can be accumulated about cancer.

The vastness and diversity of cancer research can be illustrated by reviewing some of the many approaches employed by cancer investigators.

Basic Research

A large part of cancer research is devoted to basic studies which increase understanding of the carcinogenic process and tumor development. Advances in basic research come slowly and seldom make headlines, but they are vital to the search for better methods in diagnosis, control, and therapy. The advances noted here by no means cover the entire field of basic research, but rather illustrate the kind of original work being done in laboratories of this country.

Among the advances in the basic biological sciences are those which have emerged from tissue culture laboratories. An important contribution which will make possible more effective use of tissue culture in the study of both normal and cancer cells is the three-dimensional tissue culture technique developed by Earle and his associates at the Public Health Service's National Cancer Institute (*1*). These scientists have grown massive cultures of tissue cells in the interstices of three-dimensional masses made up of thousands of glass rings. Many

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Dr. Heller since 1948 has been director of the National Cancer Institute in the National Institutes of Health of the Public Health Service. He presented the material upon which this paper is based as the William Chester Warren Memorial Lecture at the Emory University Postgraduate Clinic, June 6, 1952.

applications for this technique are foreseeable. Already it has been applied in collaborative studies with the Naval Medical Research Institute to obtain large cultures of human epithelial cells for skin grafting purposes.

A new technique for growing cancer cells outside the body in the form of recognizable tissues has been developed by Leighton of the National Cancer Institute (*2*). His sponge matrix method for tissue culture employs an ordinary cellulose sponge as the skeleton on which the cancer cells are grown. Cells grown in this way form organized aggregates which frequently resemble the tissue pattern present in the living animal. This method has been used to grow many animal tumors and at least two human tumors, a malignant melanoma and a chondrosarcoma. The melanoma grew very well and produced new pigment within the sponge. The sponge-grown tissue can be sectioned, stained, and studied with the same methods used in examining tissues from the body. This technique for tissue culture might be used to study the direct effects of drugs, hormones, or radiations on neoplastic tissues or to study the factors, and perhaps the patterns, involved in tumor growth and metastases.

A valuable tool for the study of carcinogenesis, tumor development, and related problems has been developed at Yale University by Greene, who has transplanted human tumors to the brains of mice and guinea pigs (*3*). With the exception of brain neoplasms, however, only tumors which had metastasized were transplantable. Human tumors were grown in mice for 70 to 90 days before the mice died. In guinea pigs the tumors grew for as long as 90 to 100 days.

A new medium for the growth of malignant tumor tissue which conceivably may be applied to problems of human cancer has been discovered by Lutz at Boston University (*4*). He has used the cheek pouch of the hamster as a site for the growth of neoplastic tissue, both homologous and heterologous, under conditions in which frequent observation and exact measurements can be carried on for long periods. Human tumors and tumors from the rat, mouse, guinea pig, and frog have been grown by this means.

Among the recent basic studies relating cancer to prolonged hormonal imbalance are those of Morris and his associates at the National Cancer Institute. These investigators have recently developed transplantable cancers of the thyroid gland of mice following the ingestion of thiouracil, a goiter-producing drug which inhibits the secretion of thyroxin (*5*). These cancers, when growing in normal animals, provide valuable material for experimental research dealing with problems of thyroid cancer and hormonal imbalances, and aid in the search for improved methods of using radioactive iodine in the treatment of thyroid cancer in man.

Tools for the development of cancer therapeutic measures have been provided by the chemical-screening projects conducted at the Memorial Hospital for Cancer and Allied Diseases, the National Cancer Institute, and other laboratories. Shear and his associates at the National Cancer Institute have tested more than 3,000 chemicals for tumor-damaging ability (*6*). About 500 have been found to damage sarcoma, 37 in mice following a single injection of a near-lethal dose. It must be emphasized that these compounds are not yet clinically useful, but they provide a stockpile from which it may be possible to develop drugs to treat cancers of man. It is essential that chemicals with some potential ability to affect the growth of cancer be tested thoroughly on experimental animals before they are made available for clinical trial. Screening itself is only the beginning of a chemotherapy program; it must be followed by systematic and extensive pharmacological research.

Clinical Research

In addition to advances in basic research, cancer investigators have reported encouraging progress in the search for improved methods in treatment and diagnosis.

The treatment of cancer, once limited to the use of surgery and radiation, has been expanded to include anticancer drugs, hormones, and radioactive isotopes (*7*). Although the cure of cancer still remains with surgery and radiation, these new agents are valuable additions to the therapeutic program. Perhaps progress should not be measured entirely by cure, as Steiner of the University of Chicago has pointed out, for this criterion fails to give credit to palliation

The first step in the sponge matrix method for tissue culture, developed at the National Cancer Institute. With an ordinary razor blade, thin slices are cut from narrow strips of sponge; then the slices are washed, sterilized, and placed in test tubes to receive implantations of tissue.

(*8*). In his words, "Enormous and gratifying progress has been made in prolonging life in usefulness and comfort by chemotherapeutic, endocrinological, surgical, and radiological palliative measures," and "research that results in better palliation is significant because of the possibility that by becoming very slightly more effective it will be curative."

Surgery

In the field of surgery there has been a remarkable series of refinements and improvements. Radical surgery has emerged as an important development. Knowledge of the physiological limits of surgery has become more exact. As a result, a great variety of cases that were hitherto considered inoperable and hopeless may now undergo surgery with good chances of survival.

One example of the concept of more radical surgery is seen in a review of the old and the new techniques employed in breast cancer. Previously, the mastectomy removed little more than the breast and the armpit lymph nodes. The surgical concept was enlarged because in numerous instances it was seen that the cancerous lesion spread after surgery. Following extensive research, which revealed that the lymph nodes under the ribs frequently harbor cancer cells, breast surgery began to involve the removal of more bony structure and the lymph nodes under the ribs in properly selected cases.

Many factors other than better operative techniques are also contributing to the continuing improvements in cancer surgery. Among these are better preoperative and postoperative care, better anesthesia, control of infection by antibiotics and chemotherapy, and control of shock by transfusions.

Radiation

In recent years the comparative advantages of surgery and radiation have been under intensive study, and the question of when to operate and when to irradiate is now better understood. At the same time, numerous technical advances have been made in radiation therapy. In addition to radium, radon, and medium voltage X-ray machines, the radiologist has at his disposal supervoltage X-ray generators, new types of radiation from the betatron and the cyclotron, and a number of new radioactive substances for use in treatment.

Among other advances in the field of radiation, progress has been made in controlling or avoiding radiation burns and radiation sickness. Investigating the problem of radiation sickness, scientists at a number of laboratories are seeking ways to modify lethal irradiation injuries. In collaborative studies with the Argonne National Laboratory of the University of Chicago, Lorenz and his associates at the National Cancer Institute have discovered that intravenous or intraperitoneal injections of bone marrow into mice and guinea pigs enable from 70 to 100 percent of the animals to survive acute lethal doses of irradiation (*9*). These discoveries may prove valuable in the irradia-

The large tumor on the mouse's flank is a transplant from one of a number of thyroid cancers produced experimentally in mice. The transplantable thyroid cancers provide a valuable new tool for cancer research.

tion treatment of cancer and in improving survival chances following lethal amounts of irradiation, as in atomic warfare.

In the treatment of cancer, the byproducts of atomic research called radioisotopes continue to exhibit increasing utility. Radioactive iodine has been used with good results in some cases of inoperable cancer of the thyroid. Phosphorus and sodium are used in whole body radiation; gallium, in bone tumors. Radioactive phosphorus is used in the treatment of polycythemia vera and certain chronic leukemias; gold is used in cancer and peritoneal and pleural carcinomatosis, and bromine in bladder tumors.

The use of most of these radioactive isotopes requires further experimentation. Better means must be found for localizing many of the isotopes within the cancerous areas, and more effort must be expended in developing radioactive compounds with a high degree of tumor specificity.

Radioactive cobalt appears to show some promise as a substitute for radium. More abundant than radium, radioactive cobalt is relatively inexpensive and will be available through the Atomic Energy Commission to both general practitioners and specialists who meet AEC standards. Cobalt can be handled more easily than radium and can be fashioned into various pliable shapes, thereby permitting the radiologist greater flexibility in applying dosages.

It must be emphasized that radium therapy is not going out of use. Radium still plays a tremendously important role in cancer therapy throughout the world. Through the radium loan program of the National Cancer Institute alone, 56 hospitals (in 29 States and the District of Columbia) are employing this type of therapy. Early in 1952, Roosevelt Hospital in New York City unveiled a new converging beam projector radium therapy unit. The projector, weighing 5 tons and using 50 grams of radium, has the power of a 20-million-volt X-ray machine. Radium therapy units such as this and the high voltage X-ray machines now in use offer hope for the cancer patient. With these, it is possible to reach cancers which are not amenable to other radiation therapy or for which surgery offers a low cure rate. Such units are designed to increase the effect of radiation therapy on deep-seated tumors.

Anticancer Drugs

Although their present clinical importance should not be overemphasized, one of the most encouraging aspects of cancer therapy is the rapid development of new chemical agents. None has achieved the status of a cancer cure. But it can now be said, in contrast to the dismal outlook of 15 or 20 years ago, that chemotherapy has been established as a valuable and sound adjunct to surgery and radiation.

Some anticancer drugs have had wide clinical trial. Nitrogen mustards given intravenously have produced temporary remissions in patients with Hodgkin's disease, lymphosarcoma, chronic leukemias, and mycosis fungoids. Triethylene melamine, a newer agent, has produced similar effects in Hodgkin's disease, lymphosarcoma, chronic leukemias, and neuroblastoma when administered by mouth. A drug formerly used as an anesthetic for laboratory animals, urethane (ethyl carbamate) has been found useful in the treatment of some chronic leukemias and multiple myelomas. In the treatment of acute leukemia in children, the

folic acid antagonists, notably aminopterin and amethopterin, have caused temporary clinical improvements. Among other drugs showing promise in the treatment of leukemia, there is a new compound, GT–41 or 1,4-dimethyl sulfonyl butane. Temporary remissions in chronic myelogenous leukemia have been obtained through the use of GT–41, Dr. Alexander Haddow of the Chester Beatty Research Institute, London, reported at the Second National Cancer Conference in Cincinnati during March 1952.

A technique for intra-arterial chemotherapy which may become a valuable auxiliary to surgery and radiation in treating cancer has been developed by Bierman at the National Cancer Institute's Laboratory of Experimental Oncology, San Francisco, and by Klopp at George Washington University, Washington, D. C. This technique uses specially designed catheters to inject drugs into close contact with the cancers, lessening damage to normal tissues (*10*). Administration of agents by the intra-arterial route appears to be quicker and to produce results of longer duration than intravenous injections. Recently there have been successful attempts to employ chemotherapeutic measures to prepare apparently inoperable cancer patients for surgery. Klopp and his collaborators have reported that aureomycin given intra-arterially or intravenously permitted surgery on several cancer patients whose lesions could ordinarily be considered inoperable.

Hormones

Huggins of the University of Chicago was among the first to demonstrate that induced imbalances of hormones might have marked effects on some types of neoplastic disease. He observed remissions in the growth of prostatic cancer following castration and administration of estrogenic substances. Correlative work on carcinoma of the breast by many investigators in the United States and in foreign countries has indicated that the general principles developed by Huggins may obtain in certain cases of mammary cancer. Unfortunately, the beneficial effects of hormones seem to be temporary to the majority of subjects, but there is hope that present studies will lay the groundwork for hormonal cure of certain specific cancers.

Measuring the toxicity of tumor-damaging drugs by injecting them into eggs and observing the effect on chick embryos, one of the early steps in the development of possible anticancer drugs.

Hertz and Cromer have used hormones to prepare patients for surgery (*11*). Observing the effect of progesterone on carcinoma of the cervix, they found that regressive alterations of the tumor occurred in 11 of 17 cases and that only one patient showed actual tumor progression while under progesterone therapy. More recently, Hertz has been giving intensive doses of a water-soluble form of estrogen to persons with breast and prostatic cancer. Administered intravenously and subcutaneously, these large doses are well tolerated by the body and are reported to be highly effective in activating estrogen therapy. This new technique is under study to see whether it may be more useful than other types of estrogen therapy.

Research on Diagnosis

Because the curability of cancer is closely related to early diagnosis, the problem of finding a good screening test is an urgent one. An ideal solution would be the development of a blood test like the Wassermann—a test which can be applied on a mass basis at reasonable cost and which is specific enough to identify a high percentage of cancer cases at an early stage. At present there is no such general cancer test. Many new tests have been developed and evaluated, but as yet none has been found which is sufficiently sensitive and specific to be practicable.

However, the approach seems hopeful. It is known, for instance, that there are changes in the body chemistry of cancer patients. For example, in some patients with prostatic cancer the acid phosphatase level is increased. Much effort is being expended in this area of research. Among the approaches are physical and chemical analyses of the body fluids, development of certain immunological reactions and many enzymological procedures, and the use of radioactive tracers.

Although a useful general test appears to be still in the future, some of the specific tests show definite promise. One of the most useful is the cytologic examination developed by Papanicolaou of Cornell University Medical College. Briefly, this test consists of collecting exfoliated cells—by aspiration or scraping—from a hollow part of the body; then placing the cells on a glass slide and examining them for possible cancer. The method is particularly useful as an aid to the diagnosis of cancer of the uterine cervix. In the past few years many qualified persons have been trained in the techniques of this test and the interpretation of its results, and at the present time some practitioners are routinely employing this screening procedure in cervical cancer diagnoses.

Although this test is theoretically applicable to any of the body excretions, further experimentation is necessary to determine its general use. From the standpoint of accuracy, the method is applied at present with greatest success in the diagnosis of cancer of the uterine cervix and the lung.

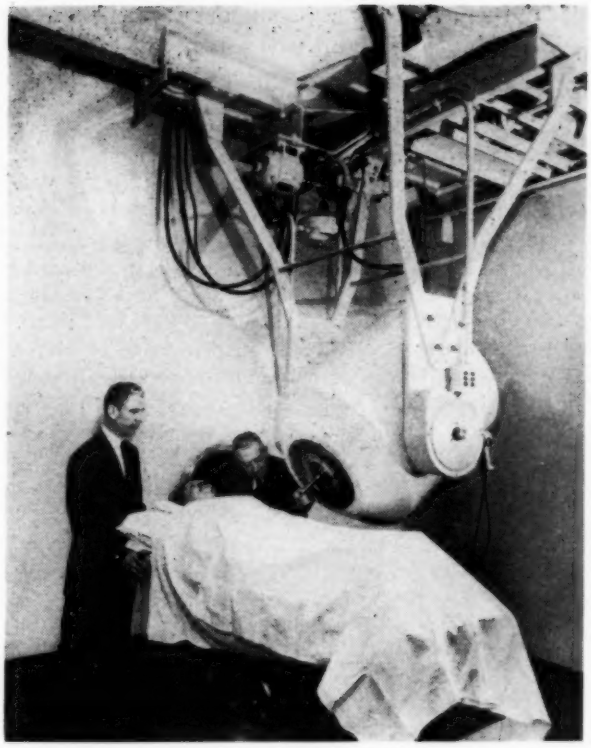
Cancer of the uterine cervix is of great clinical importance. The uterus is the second most frequent site of cancer in the female, and in that organ the disease occurs most frequently in the cervix. Cancer of the uterine cervix is reported to be 75 percent curable in the early stage and 15 percent when moderately well advanced. To determine the case-finding possibilities of the cytologic method in cancer of the uterine cervix, a 3-year study is under way in Memphis and Shelby County, Tenn., in which all women 20 years of age and older will be given an opportunity to have cytologic examinations for uterine cancer at yearly intervals. Supported by grants-in-aid from the National Cancer Institute, this project is being conducted with the cooperation of the Memphis and Shelby County Medical Society, the Memphis and Shelby County Health Department, the Department of Obstetrics and Gynecology and the Institute of Pathology of the University of Tennessee College of Medicine, and the Memphis Division of the American Cancer Society. (See *Public Health Reports*, June 1952, frontispiece.) Further studies in this field will be done in the cytology laboratory which the National Cancer Institute will operate in the Public Health Service's new Clinical Center at the National Institutes of Health, Bethesda, Md.

Variations of the original cytologic technique have been developed for the diagnosis of cancer of other sites. An abrasive balloon technique has been used with some success in the detection of gastric carcinoma. In this technique the balloon, covered by a fine, silk mesh, is inserted in the stomach, inflated, deflated, and withdrawn. The stomach debris which clings to the mesh of the balloon is examined with a microscope for cancer cells. Although this new diagnostic tool shows considerable promise when used in conjunction with X-ray, it requires further evaluation.

Gastric cancer is the first-ranking cause of cancer deaths among men. The development of a good diagnostic procedure for this type of cancer is essential since conventional methods discover only about one-fifth of the cases at an early stage. Toward this end, Traut and Rosenthal of the University of California have developed another new technique. It consists of washing the patient's stomach with a solution of papain, an enzyme which dissolves the mucus on the stomach lining and thereby frees cancer cells trapped by the mucus.

In the X-ray field at least two tools have been developed which aid the early detection of gastric cancer. Morgan at Johns Hopkins University has adapted the Schmidt camera to photofluorography for mass screening to discover gastric cancer. Moon at the University of Chicago has developed a device which combines X-ray and television equipment to give sharp, clear pictures of the dense parts of a patient's body.

Atomic energy research has provided still another approach to cancer diagnosis, that is, the use of radioisotopes as tracers to localize tumorous tissues. The use of isotopes in can-



The new converging beam projector radium therapy unit at the Roosevelt Hospital in New York City.

cer diagnosis rests upon the fact that certain abnormal body tissues concentrate large amounts of specific compounds above that of normal tissues. When these compounds are tagged with radioisotopes, the tissues which require the greatest amount of the compounds can be located with the aid of a Geiger or scintillation counter. Several isotopes appear to be of value in diagnosing cancers of various sites. Of the radioactive isotopes which have been used in their elementary form as diagnostic tracers, the best known is radioactive iodine for the diagnosis of metastatic cancers of the thyroid. Diiodofluorescein dye tagged with iodine has been used successfully in the localization of brain tumors, as has human serum albumin tagged with iodine. Phosphorus has been used with limited success in the diagnosis of cancers of the brain, breast, and testicle.

Cancer Morbidity Studies

The search for a diagnostic test has received much assistance from the rapidly developing field of cancer epidemiology. A number of studies and surveys relating to cancer morbidity and mortality have been conducted which may provide the answers to such questions as: How many people have cancer? How many can expect to get cancer? What sites in the body are most frequently attacked by cancer? How are age, sex, and race associated with specific cancer sites?

Dorn and his associates at the National Cancer Institute have prepared a series of cancer morbidity studies based on data for 1947–48 and covering 10 major metropolitan areas: Atlanta, New Orleans, Birmingham, Dallas, San Francisco, Denver, Detroit, Chicago, Pittsburgh, and Philadelphia. These studies are particularly valuable since they present comparative data over a 10-year period, each of the areas having been surveyed in 1937–39. Following publication of reports on the individual areas, a United States summary will be prepared. This summary will contain geographic comparisons, interpretations of apparent national trends, and special analyses which are not feasible for individual areas. In general, the studies re-emphasize the importance of the varied programs directed toward achieving early diagnosis and treatment.

Summary of Progress

Cancer progress has many aspects. One is the drastic and wholesome change in public attitudes. Another important change is that cancer research is at last being supported on a scale that permits concerted, continuous effort. Since the close of World War II, unprecedented support and coordination of cancer research have been provided, research facilities have been increased substantially, and the number of research investigators augmented greatly. Investigation at the basic level is being pursued to an extent unknown just a few short years ago, yielding a gratifying number of advances in fundamental knowledge. The armamentarium of the research investigators has been strengthened by the addition of tools such as the cyclotron, the mass spectrograph, the electron microscope, and the ultracentrifuge. With improvements in cancer diagnostic techniques have come increases in cancer clinics and other facilities for diagnosis and treatment. Cancer surgery has been refined and improved, technical advances in radiation therapy have been achieved, and chemotherapy has been established as a sound adjunct to both. Research has added much information on carcinogens and carcinogenesis which may be useful in the prevention of cancer.

It is doubtful that anyone would venture to say how close we may be to solving the cancer problem. It is a complex and serious one and we must prepare for a long and costly effort. Although false hope must not be placed on preliminary reports and unsubstantiated claims, recent progress indicates that cancer can be regarded as a practical, scientific problem which science can solve—and will solve.

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Mechanical Air Drying Of Hands Following Preoperative Scrubbing

By PAUL E. WALKER, M.D.

THERE ARE several possibilities of bacterial contamination inherent in the drying of the hands and forearms following preoperative scrubbing. Contamination by dust-carried airborne bacteria is one of these. The degree of such contamination will vary with the amount of circulating dust, duration of exposure, and moisture content of the air. Since most operating room layouts are similar, these factors will probably be fairly constant among different hospitals. Scrubbing techniques differ somewhat, but the differences are not great enough to allow much variation in the elimination of bacteria. It is in the drying of the hands that the greatest possible opportunities for contamination exist. In the use of sterile towels for drying, these opportunities are the greatest. Improper rotation of the towel during drying, the touching of the scrub suit or of the unscrubbed portions of the upper extremities, all offer great probabilities of gross contamination.

It would seem that simple air drying of the hands would eliminate these probabilities of contamination. Such a method further has the advantage of elimination of more costly methods of drying. However, it is slow, physically uncomfortable, and may cause chapping of the skin. It could be followed by dust-laden air contamination in relatively dry operating rooms.

To overcome all these difficulties, it seemed to us that the mechanical air dryer had definite possibilities. Before accepting such a device for use, however, it had to be determined whether or not the forcing of warm air over the extremities would increase contamination, and whether or not it would be economically practicable. This study was undertaken to determine these two points.

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Operation of Machine

The air dryer was a standard model manufactured by a national manufacturer, and was not modified for this study. It is a blower mechanism mounted in a white enamel chassis, operated by a small 110-volt motor which forces a current of air over an electrically heated grid. This current of air is directed through a nozzle downward or upward over the extremities. The switch is operated by a trip mechanism mounted on the front, which can be activated by the shoulder or elbow. This mechanism allows the motor to operate for 30-second intervals, but the time can be modified without difficulty. The machine was mounted at a convenient height on a door in the scrub room adjacent to the scrub sinks. We considered this location preferable to any other because of the high moisture content of the air and because of its convenience. Installation of the machine was simple and was done easily by the station electrician.

A standard scrub routine was adopted. Duration of scrubbing, scrubbing solution, and cleansing of nails was the same before each sample was taken. To further standardize the procedure, only the first scrub of the day for each individual was used. No sterile or antiseptic washes or solutions were used except a .66-percent hexachlorophene soap.

In the study on sterile towel-drying technique, the subject after scrubbing walked to the adjacent operating room where he was immediately given a sterile towel by the scrub nurse. He dried his hands in his usual manner. With the air dryer the arms were dried for 60 seconds under the jet of warmed air, the hands being rubbed together as drying proceeded. (With one man the drying period had to be 90 seconds because of his size and heavy hair distribution.)

Following either method, the hands were immersed in a sterile basin containing 1,000 cc. of distilled water and agitated freely. In the first series the water was allowed to run down

the elevated forearms into the basin. Since this was thought to be a possible source of contamination from water running over the unscrubbed upper arm, this step was eliminated in the second series.

The laboratory procedure was as follows: A 1-cc. sample was taken from the basin of sterile distilled water and added to 20 cc. of nutrient agar in a sterile flask. This was mixed thoroughly and then poured into a Petri dish. After overnight incubation at 37° C., the number of colonies on each plate were counted and recorded.

Contamination

Air samples for bacterial contamination were taken in two operating rooms and in the scrub room for the first 9 days of the study. Since results were so variable and there was no correlation with the other results, this study was abandoned.

Eleven surgeons and six nurses participated in the first study. The surgeons were mixed staff, residents, and interns. One of the nurses was a novice. As shown in table 1, 77 towel-drying cultures and 77 air-drying cultures were taken from this group.

In this group it is to be noted that if colony counts of 50 or over are considered as gross contamination, then 12 subjects in the towel-drying group were so contaminated and only 3 in the air group. If 100 colonies or over are considered as gross contamination, none of the air-dry group and 9 of the towel-dry group were so contaminated.

In the second series, as shown in table 2, three doctors and two nurses were used, each of whom had 15 air-dry and 15 towel-dry cultures. The technique was modified in this group, as mentioned heretofore, in that the hands only were immersed in the solution.

In the second series group the differences are not so great because the subjects were selected and more experienced personnel whose technique might be expected to remain the same from day to day. Here again, however, if 50 colonies per cc. or over is considered gross contamination, the ratio of towel to air is 11 to 4; in cultures showing 100 or more colonies the ratio is 1 to 0.

If presented somewhat differently and combined as in table 3, the differences are more significant. If colonies showing 50 or more are taken, the ratio of contamination of towel to air is 23 to 7. If colony counts of over 100 are

Table 1. Series I

Subject	Number of cultures		Average number colonies		Difference	Number of cultures over 50 colonies	
	Towel	Air	Towel	Air		Towel	Air
Surgeon No:							
1	5	5	11	7	4	0	0
2	1	1	5	0	5	0	0
3	5	5	6	10	[1] −4	0	0
4	5	5	64	18	56	3	0
5	5	5	13	18	−5	0	0
6	5	5	54	18	36	3	1
7	5	5	0. 8	5	[1] −4. 2	0	0
8	3	3	18	1	17	0	0
9	5	5	6	50	[1] −44	0	2
10	5	5	20	0. 4	19. 6	1	0
11	4	8	5	7	[1] −2	0	0
Nurse No.:							
1	7	6	28	5	23	1	0
2	4	1	3	9	[1] −6	0	0
3	5	5	13	6	7	0	0
4	3	2	67	3	64	1	0
5	5	6	39	9	30	2	0
6	5	5	36	22	14	1	0

[1] Minus sign used to show instances of larger number of colonies by air drying.

Table 2. Series II

Subject	Number of cultures		Average number colonies		Difference	Number of cultures over 50 colonies	
	Towel	Air	Towel	Air		Towel	Air
Surgeon No.:							
1	15	15	23	24	[1] −1	2	3
2	15	15	0.6	1.6	[1] −1	0	0
3	15	15	40	19	21	5	1
Nurse No.:							
1	15	15	15	10	5	2	0
2	15	15	16	3	13	2	0

[1] Minus sign used to show instances of larger number of colonies by air drying.

taken, the ratio is 10 to 0. It is believed that these figures are probably significant and indicate that gross contamination by the mechanical air dryer is apparently less common than by sterile towels.

Cost of Machine

The cost of the machine was $140. Installation cost was negligible and installation was done by station labor. The maintenance cost will probably be negligible for approximately 5 years. On the other hand, we estimated that we used in this hospital yearly an average of 10,000 towels for hand drying alone. Laundering cost was estimated by our laundry superintendent as being about $90 yearly. Replacement due to wear and tear approximates about 100 towels a year at an estimated cost of $20. Adding to this the cost of folding and pack make-up, the saving over a period of 5 years is obvious.

Table 3. Total figures for both series

Number of colonies	Number of cultures	
	Towel dry	Air dry
0–5	77	92
5–10	21	14
10–20	14	18
20–50	17	21
50–100	13	7
Over 100	10	0
Total	152	152

The dryer tested can be used satisfactorily in its present form. For convenience, however, the trip mechanism should be adjusted to 90 seconds. The manufacturer has advised us that this can be done without extra cost. For added convenience a foot-operated mechanism could be built. This, however, would add somewhat to the over-all cost of the machine. We considered at first the installation of a filter in the mechanism, but in the light of our studies we do not consider this feature necessary. It would entail certain technical difficulties and added expense that are probably not indicated. Further studies with a filter, however, would be of interest to see if bacterial counts could be reduced still further.

Conclusions

1. Bacteriological studies of 304 cultures, taken from groups of surgical personnel after use of a standard scrub technique, showed a probably significant reduction of gross contamination of the hands when a mechanical air dryer was used.

2. The mechanical air-drying technique is less expensive than the towel-drying technique.

Histoplasmin and Tuberculin Sensitivity In Texas Infants and Children

By GILBERT B. FORBES, M.D., and CHARLES C. CHANG, M.D.

HISTOPLASMOSIS, a disease of variable symptomatology caused by the fungus *Histoplasma capsulatum*, was first described by Darling in 1906 (*1*). The disease has received increasing attention during the past decade. An increasing number of clinical instances of the disease are being recognized. In 1941, a histoplasmin skin test was developed (*2*, *3*). And in 1945 researchers reported that a large number of tuberculin-negative individuals with roentgenographic evidence of pulmonary calcification reacted to the skin test antigen, suggesting that a benign form of the disease exists (*4*).

Extensive skin test surveys have revealed that the percentage of positive reactors among the young adult population is highest in the Ohio, Missouri, and lower Mississippi valley regions and tends to fall off rather sharply with increasing distance from this area, the values varying from 88 percent positive reactors in Kansas City, Mo., to less than 5 percent in the northwest and extreme southeastern parts of the United States (*5–7*).

In 1951 histoplasmin skin tests were done on 441 infants and children born in Texas. The subjects were selected at random from patients on the wards of the Children's Medical Center, patients attending the out-patient clinic, and from the pediatric patients seen at Parkland Hospital and St. Paul's Children's Hospital, all in Dallas, Tex. Infants cared for at a nearby foundling home and older children hospitalized at the Scottish Rite Hospital for Crippled Children were also included. The subjects ranged in age from a few days to 16 years. The skin testing program was conducted during the period from April to August 1951.

Dr. Forbes is chairman of the department of pediatrics, Southwestern Medical School of the University of Texas, and Dr. Chang is now resident house officer, Willard Parker Hospital, New York City. Dr. Jerry E. Miller, clinical associate professor of radiology of the Southwestern Medical School, interpreted the roentgenographs.

Material

The histoplasmin (lot H–42) was obtained from the Division of Chronic Disease and Tuberculosis, Public Health Service. It was in the standardized dilution of 1:100. Tuberculin tests were made simultaneously, using old tuberculin in a strength of 1:1000 (0.1 mg.).

The histoplasmin injection (0.1 cc.) was made intradermally on the volar surface of the left forearm, while that of the tuberculin (0.1 cc.) was made on the volar surface of the right forearm. Separate sets of needles and syringes were used. The reaction was read 48 hours after the injection and was considered positive if the area of induration was 5 mm. or more in diameter, without regard to erythema.

Results

Among the 441 histoplasmin and tuberculin tested children, there were 31 positive histo-

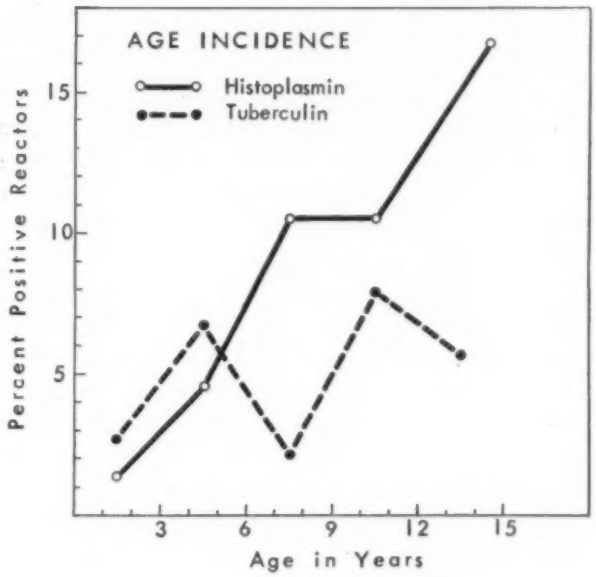
plasmin skin tests and 20 positive tuberculin skin tests, an over-all incidence of 7.0 and 4.5 percent, respectively. Two children reacted to both histoplasmin and tuberculin. The total number and percentage of positive results were further grouped according to sex, group, birthplace, and type of disease on admission to the hospital or clinic (table 1).

Although there are minor differences in both tuberculin and histoplasmin sensitivity among the three groups and between sexes, these differences are not statistically significant. Individuals born and reared in the rural areas of Texas would appear, at first glance, to have a definitely higher degree of sensitivity to histoplasmin than Dallas residents, but this difference also is not significant statistically. Nor is there a significant difference (P=0.08) in histoplasmin sensitivity between individuals suffering from some chronic disease and those who exhibited no disease at the time of testing.

Roentgenograms of the chest were taken for each child who showed either a positive tuberculin or a positive histoplasmin skin test, or both. Of the 20 subjects with positive tuberculin tests, 9 (45 percent) had pulmonary calcification. Among the 31 with positive histoplasmin tests, 8 subjects (25.8 percent) had roentgenographic evidence of pulmonary calcification.

In studying the influence of age on both histoplasmin and tuberculin sensitivity, we find a trend toward increased histoplasmin sensitivity as the subjects become older; indeed none of the 94 subjects in the 0–2-year age group exhibited a positive test. The pattern of tuberculin positivity is much less regular and shows no consistent age variation (table 2). The effect of age on histoplasmin sensitivity can be seen better in the chart where the subjects are divided into larger age groups on an arbitrary basis.

Effect of age on histoplasmin and tuberculin sensitivity, 441 Texas children



Discussion

Palmer observed 21 (34.4 percent) positive histoplasmin reactors among 61 Texas student nurses (*6*). Christie and Peterson in a survey of histoplasmin sensitivities at Vanderbilt University recorded 7 positive tests (25.9 percent) among Texans (*4*). Beadenkopf and his associates, working at the University of Chicago,

Table 1. Comparative incidence of sensitivity to tuberculin and histoplasmin related to sex, race, birthplace, and type of disease on admission to hospital or clinic

Number and percentage	Sex		Group			Birthplace		Type of disease		
	Male	Female	White	Negro	Latin-American origin	Dallas	Non-Dallas	Acute	Chronic	None
Total number	227	214	258	138	45	228	213	165	225	51
Tuberculin positive:										
Number	11	9	13	4	3	13	7	6	12	2
Percent	4.8	4.2	5.0	3.0	6.7	5.7	3.3	3.6	5.3	3.9
Histoplasmin positive:										
Number	18	13	22	5	4	8	23	9	21	1
Percent	7.9	6.1	8.5	3.6	8.9	3.9	10.8	5.5	9.3	2.0

found an incidence of 30 percent among 100 students who had resided in the State of Texas for most of their lives (*7*). In a study of 200 adults at the Parkland Hospital, Dallas (both in-patients and the hospital personnel were tested), an incidence of 31 percent positive reactors was observed (*8*). All of these studies were done on adults or individuals in the late teens. Except for Chapman's series, none of the individuals tested were living in Texas at the time the test was made.

Comparison of our results with those reported for children from the St. Louis, Mo., area (*9*), reveals that the increase in percentage reactors with age is less precipitous in the Texas series. For example the incidence of positive reactors in the 3- to 6-year-old St. Louis group is approximately four times that of the comparable age group of Texas children, and there is a threefold difference in the 6- to 12-year age group. Consequently, it would appear that individuals of all ages have a higher incidence of histoplasmin reactivity in the St. Louis area than individuals in the region around Dallas.

It is of interest that none of the patients in our series was considered to have clinically manifest histoplasmosis.

Table 2. Incidence of tuberculin and histoplasmin sensitivity related to age

Age (year)	Total number	Tuberculin		Histoplasmin	
		Number	Percent positive	Number	Percent positive
0–1	57	1	1.8	0	0
1–2	37	2	5.4	0	0
2–3	52	1	1.9	2	3.8
3–4	30	3	10.0	1	3.3
4–5	25	0	0	1	4.0
5–6	33	3	9.1	2	6.1
6–7	28	0	0	3	10.7
7–8	32	0	0	1	3.1
8–9	35	2	5.7	6	17.1
9–10	28	1	3.6	5	17.9
10–11	30	5	16.7	3	10.0
11–12	18	0	0	1	5.6
12–13	16	2	12.5	3	18.8
13–14	12	0	0	1	8.3
14–15	8	0	0	2	25.0

Summary

Histoplasmin and tuberculin skin tests were performed on 441 infants and children whose birthplace and principal residence was in Texas. Most of the patients studied lived in Dallas or the immediate surrounding territory. A significant degree of relationship between age and histoplasmin sensitivity was noted.

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Public Health in the Western States

By WILTON L. HALVERSON, M.D.

PUBLIC HEALTH services in the western States and Territories have developed remarkably since the organization of the Western Branch of the American Public Health Association 23 years ago.

The rapid increase of the population of the West and the resulting industrial expansion, accentuated by the production requirements of World War II and the present situation, have been accompanied by tremendous health, social, and economic problems, the solution of which is taxing our resources. It requires the best combined efforts of every individual who finds himself a part of the movement.

On the West was placed the responsibility of providing a tremendous amount of war materials, since the war requirements were far greater than the potential capacity of the eastern and midwestern production centers. The danger of overconcentration of industry in any section of the country was an additional and potent reason for the decentralization of the shipbuilding and airplane industry. The West offered labor reserves and natural resources that could not be ignored. California's war contracts, for example, were larger than those of any other State for about 2 years.

With the end of actual fighting and the fulfillment of war contracts, the expected large-scale unemployment and an exodus of workers to their former homes in the Midwest and the South did not occur. On the contrary, the population increase continued almost unabated. Thousands of war veterans who had spent months in the training camps in the West decided to make the West their permanent home. And industry, quick to see the advantage of manufacturing commodities near the place of consumption, converted war plants to peacetime production.

The public health profession is particularly challenged not only by the problems posed by the physical characteristics of the area, such as the limited water resources in a large part of the West and the rapid industrialization of its centers, but also by the country's entrance into a new phase of scientific development, the atomic age. Atomic development comes at a period when time and space have been compressed by transportation of a speed surpassing sonic limits and a time in history when world peace is uncertain.

What part will the public health profession of the West play in such a time as this? Will we stay with the stereotyped and traditional aspects of our "basic six," or will we stir into an awareness of the problems confronting us now and think and plan for the eventualities of this year and the years to come?

There are many problems for which we must find solutions if we are to discharge the responsibilities society has placed upon us.

Atomic Energy Control

In atomic energy we have probably the most significant and potentially dangerous processes to which society has ever been exposed. Dr.

Dr. Halverson, director of public health of the State of California, is president of the American Public Health Association. *This article is based on a paper presented at the annual meeting of the Western Branch of the Association, Denver, Colo., June 1952.*

Abel Wolman has pointed out: "In the place of a few radium dial painters doing standardized work . . . thousands of workers now perform hundreds of tasks in the vicinity of materials releasing much more radiation than man has ever known before. . . . Some idea of this total rapid advance may be obtained from the fact that less than 10 years ago approximately 3 pounds of radium were under human control. Today radioactive materials are being produced and in many instances are being used to the equivalent of millions of pounds of radium" (*1*).

The interest and concern of the public health worker should not await the solution of all of the inherent problems. This may take a long time in such a complex field, and in the meantime hundreds of deaths may take place. Like any other problem, it requires analysis and action on the basis of the best available evidence. The epidemiologist, for example, will in this case be concerned with the amount, type, and period of radiation rather than with the types and virulence of bacterial infection. "The sanitary engineer must think about the number and size of processing units which require water supply, heat exchange, drainage, air conditioning, and ventilating equipment" (*2*).

Information regarding the distribution of radioisotopes, which has grown from a few hundred shipments in 1946 to several thousands annually, is made available to State health departments by the Atomic Energy Commission. The only information withheld from the States relates to shipments for classified uses.

The Atomic Energy Commission has been careful to supply the user with information regarding toxicity of the materials and the length of safe exposure. In spite of these precautions mistakes can be made and accidents may occur. In California a drum of radioactive cobalt accidentally fell from a truck. Fortunately, it was picked up by students who understood its significance and returned it to the laboratory. In another instance, a medical technician in a southern hospital was conducting analytical procedures with a radioactive substance in a manner which was subjecting her to total radiation of many times tolerance (*1*).

Are waters used for cooling properly protected from radiation or if exposed are they properly safeguarded? Are industrial wastes from establishments using these products properly controlled so as to prevent harmful contamination to people in the general area and to life in general? These are questions of prime importance to the public health.

While the information made available to the public has sometimes been overdramatized, the evidence available is sufficient to indicate the great importance of establishing control programs.

This is a field which requires careful exploration before administrative action is taken. California is in the process of this phase of the work. Following consultation with the Public Health Service, the State health department has assigned primary exploratory responsibility to an engineer who will, with the help of a staff advisory committee and other experts, outline a program of control which the department will recommend to the governor and the legislature for action.

Health departments, particularly in the more populous States, can no longer allow events to take their natural course in this urgent problem.

Occupational Health

With the rapid industrialization of the West, we must give greater consideration to, and develop a broader interest in, the health of the worker. Our industrial growth is not simply an increase in size. It also relates to the development of new substances and new processes, the toxicity and potential danger of which in many instances have not been defined.

Hundreds of new chemicals are being introduced to control agricultural and domestic pests. A knowledge of the toxicology of parathion, a powerful and effective insecticide—one of the so-called nerve poisons—is of great importance in the protection of workers both in the factory and in the field. New materials and new methods are coming with such regularity and rapidity that we can apply the simile which so aptly described the golden age of bacteriology—they come like corn popping in a pan. This is truly the age of chemistry and physics, just as the last half of the last century was the age of bacteriology.

At the last meeting of the California Conference of Local Health Officers and of the Cali-

fornia State Board of Health, we discussed the control of the chemical, lindane, an insecticide that can pass directly from the solid to the gaseous state, the speed of this transfer depending on the temperature of the solid.

An enterprising and well-financed company has developed a business based on the distribution of thermogenerators for the dissemination of lindane or other pesticides in eating places and other closed areas where insects are a nuisance. The question of hazard through inhalation and food contamination immediately confronts us and requires that a decision be made as to whether this method of insect control shall be regulated or prohibited.

So many new occupational health hazards are being introduced that industrial hygiene workers can scarcely become familiar even with the names of the new substances. While we are greatly concerned about the specific occupational health problems that relate to the worker's environment, we are also concerned about his general health and to this end should be developing methods and procedures to make available the various established health services.

It is timely that we think of industrial health in terms of general health, particularly because of the developing interest in chronic diseases and the accumulating knowledge, small as it is at present, about what can be done to prevent chronic disease and to prevent to some degree the premature disabilities these conditions bring about.

Labor and industry are approachable in this matter, and in some instances they are ready to work with public health agencies in developing programs which will conserve the already short labor supply and which can lighten the load of workmen's compensation by protecting the health of the worker through well-planned preventive programs.

Chronic Disease Control

Chronic disease control is a controversial subject in many ways. Can a measurable amount of disability be prevented by early diagnosis and preventive measures? Should health departments be concerned with personal health only as it relates to contagious disease and the special field of maternal and child health? Are multiphasic screening tests profitable and effective? These elementary questions and many others require practical answers.

The Commission on Chronic Illness, jointly sponsored by the American Hospital Association, the American Medical Association, the American Public Health Association, and the American Public Welfare Association, has stated: "The basic approach to chronic disease must be preventive. Otherwise, the problems created by chronic diseases will grow larger with time, and the hope of any substantial decline in their incidence and severity will be postponed many years" (*3*).

Weight control is a specific preventive measure related to chronic illness. Public health agencies, both voluntary and official, can unite with other community organizations in planning a program which, if effectively carried out, can add productive healthful years particularly to those above middle age. Several health departments have already initiated such programs and undoubtedly others will marshal their nutritionists, health educators, and other workers to take aggressive action in this area of chronic disease prevention, which lends itself to the mass as well as the individual approach.

Much has been written concerning the relationship of health departments with the private practitioner of medicine. As the years have gone on, most health departments have developed a working relationship with medical societies and with such specialized groups as pediatricians and obstetricians. These working relationships have contributed much to the success of preventive programs. They have convinced most physicians that the purpose of the health department is not to foist "socialized medicine" on the community but to unite with physicians and hospitals in bringing to the community the advantages of preventive services when this is feasible.

In the development of the preventive aspects of the control of chronic illness, this close working relationship is vital. State and local health departments have here a unique opportunity to bring before medical societies the newer developments related to prevention. When this has been done, progress has been made not only in attaining immediate objectives, but also in developing good working relationships in other parts of the public health program.

Here too is an opportunity to develop the interest of a State or local health council. Here is an objective which challenges the interest of almost every family in the community, for a great many have had the problem of caring for a close relative who has spent months or years the living victim of a chronic illness which perchance might have been prevented. It is a problem which each year results in an ever-increasing financial burden to the home, the county, and the State. Public health workers share with the community and private practitioners of medicine the responsibility of finding ways and means to reduce this financial and social burden by the application of preventive measures as they become available.

International Health

In addition to the responsibility we owe to our community, our State, and our Nation, there is an international responsibility. The United States fully supports the program of the World Health Organization, a specialized agency of the United Nations created for the purpose of improving the health of the people of all nations. And for 10 years we have participated in bilateral cooperative health programs in Latin America, administered by the Institute of Inter-American Affairs. Congress has subsequently adopted the policy of providing technical assistance, including health programs, in other underdeveloped countries. In addition to the 17 countries of Latin America, health missions have been established in Liberia, Greece, Turkey, Iran, India, and all of the countries of Southeast Asia. These bilateral programs are increasingly coordinated with the WHO programs (*4*).

From my own experience in surveying the health and sanitation program of the Institute of Inter-American Affairs, I am convinced that the public health movement in Latin America has been materially advanced and that there is tangible evidence of appreciation of the help that has been given.

I am also convinced that if the United States is to continue successfully the policy of technical assistance in the field of public health, ways and means must be found to use health personnel of State and local health departments, medical schools, public health schools, voluntary health organizations, private physicians, and all of the other health resources of the various States. Some plan must be developed which will make it possible for health workers to be released for periods of foreign service in order that the programs may be conducted effectively, with credit to the health profession and to our country.

Public health workers can no longer be content and satisfied to restrict their interests to traditional public health services in this country in the face of the crying needs of a world at the crossroads. We must indeed continue to carry on these programs and in addition we must accept the responsibility of developing new and needed programs at home and be willing on call to assist our world neighbors in taking their early steps in the development of health services.

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Health Conservation Activities of TVA

By O. M. DERRYBERRY, M.D., M.P.H.

THE WIDELY reported accomplishments of the Tennessee Valley Authority in regional resource development have involved many practical applications of the art and science of modern preventive medicine and public health. It was early recognized that the program would necessarily be concerned with health in two different areas: one, the health and safety of its employees; the other, the impact of its major activities on health problems of regional significance. Responsibility for both interests has been centered in a single administrative unit of TVA, the division of health and safety.

An important factor in TVA's success in the health field as well as in other fields has undoubtedly been the flexible management system under which the program operates. Former Chairman David Lilienthal described the essential characteristics of the system as follows: ". . . a Federal autonomous agency with authority to make its decisions in the region; . . . responsibility to deal with resources as a unified whole, clearly fixed in the regional agency, not divided among several centralized Federal agencies; . . . a policy fixed by law that the Federal regional agency work cooperatively with and through local and State agencies" (*1*).

Dr. Derryberry is director of health of the Tennessee Valley Authority. This paper is a revision of the material he presented at a seminar conducted by the University of Pittsburgh School of Public Health in April 1951.

Employee Health and Safety

Appropriate as objectives of a sound program of employee health and safety services are the "three declared purposes of public health" named by Dr. Haven Emerson and Dr. Thomas Francis, Jr., at an informal conference called in March 1951 to consider future directions of public health. These objectives are "to develop and improve health among our people, to protect them against preventable diseases, and to prolong the average length of life in terms of both quality and quantity."

The TVA employee health and safety program includes preplacement medical examinations, immunization service, periodic health examinations, health education and guidance, prevention of accidents, medical and engineering control of occupational health hazards, and mental hygiene services, along with treatment and rehabilitation of the industrially disabled worker. It is viewed as a dynamic management service undertaken to promote efficiency and economy through the conservation of employee health and as a valuable part of good employee-management relationships. Protection of the health and safety of workers is a responsibility of management recognized by the workmen's compensation laws. Management does not, however, always recognize that provision of this service is also an opportunity to protect its investment in the effective manpower so necessary for successful operation in a highly competitive economy.

To the difficulties ordinarily encountered in the administration of a program embracing these functions must be added, in TVA, the

Vision testing of employees in a powerhouse, a measure which promotes efficiency and aids in the conservation of sight.

factors of dispersion of employees over an area covering 80,000 square miles, a great variety of high-risk occupations in which employees must be carefully placed so that their assignments will be within their physical capacity, and the necessity for developing methods by which the services of State and local health agencies and community medical services may be effectively utilized. At locations where large numbers of TVA employees are concentrated, most of the services are provided through field units operated directly by TVA. The services of local and State health agencies are, however, utilized to the greatest extent feasible. Immunizations, chest X-ray surveys, laboratory service, and communicable disease control are examples of services provided from this source.

Not the least among the tasks to be accomplished in carrying out an employee health and safety program is the enlistment of the cooperation, support, and participation of the operating divisions of the organization. Where supervisors in the construction division, the chemical engineering plant, or the power plant, for example, participate actively in identifying needs for health and safety service and in developing plans to meet those needs, inevitably a better job is done than could be done by the division of health and safety alone. This approach also permits sharing on a broader basis the satisfaction of having determined the need for action and of having taken it.

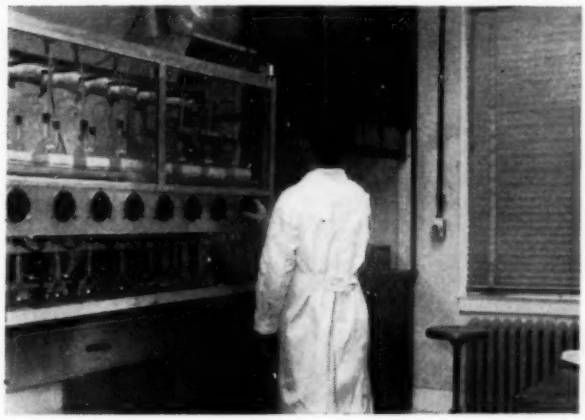
Sometimes a problem in learning to share responsibility is also encountered within the organization directly responsible for provision of health services. This problem arises principally from the fact that in matters of health the traditional role of the physician has been authoritarian. It is not always easy for him to realize that in preventive and industrial medicine and in public health the medical sciences are but a part of the total technology which must be applied to achieve maintenance of health and prevention of disease and disability.

Services Provided

Figures on the number of services TVA has provided show that its interest in employee health has been realistic. Between November 1, 1933, and July 1, 1952, well over half a million medical examinations were performed; more than 400,000 immunizations against communicable diseases were provided; over a million health maintenance services, including professional consultations, were made available; and about a million job-related injuries were treated. In addition, more than 550,000 clinical diagnostic laboratory services were furnished, and over 90,000 dental hygiene services related to specific occupational disease hazards were given. Until venereal disease treatment was simplified by the establishment of rapid treatment centers and by the provision

Testing hearing of an employee to insure his fitness for work that requires good hearing.

Industrial hygiene laboratory, Wilson Dam, Ala. The section shown is devoted to fluorine studies in connection with the operation of the Tennessee Valley Authority chemical plant.



of widespread services through State health departments, over 100,000 venereal disease treatments were administered.

Some appraisal of the qualitative effect of the services can be made by such observations as the number of employees with physical defects who benefited from occupational placement and the number of referrals and corrections made following periodic health examinations. For example, at one Tennessee Valley Authority construction project 15 percent of the 2,344 employees were selectively placed in jobs having requirements compatible with their physical limitations as determined by employment medical examinations. Periodic medical examinations have found as many as 50 percent of the employees examined to have some condition for which corrective advice or treatment was indicated and referral made. Also significant is the fact that not a single case of smallpox or typhoid has been known to occur at a TVA construction camp.

The accident frequency rate was lowered from 62.5 accidents per million man-hours worked in 1935 to 5.5 accidents per million man-hours worked in 1951. Accident severity was reduced from 6.95 days lost per thousand man-hours worked in 1935 to 1.45 days lost per thousand man-hours worked in 1951. During this time the employee population of TVA varied between about 12,000 and 42,000, with an average of about 15,000. It is a matter of simple arithmetic to calculate the saving in the cost of accidents effected by these reductions.

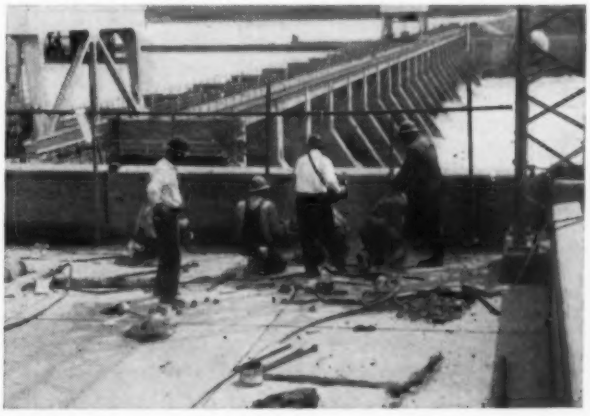
The application of the preventive concept to all phases of the development of projects from planning through construction and operation, the masterful job in safety education done by technicians in collaboration with supervisors, and the close integration of the interests of preventive-minded safety engineers and industrial physicians have all undoubtedly served "to develop and improve health among our people, to protect them against preventable diseases, and to prolong the average length of life in terms of both quality and quantity."

Malaria Control

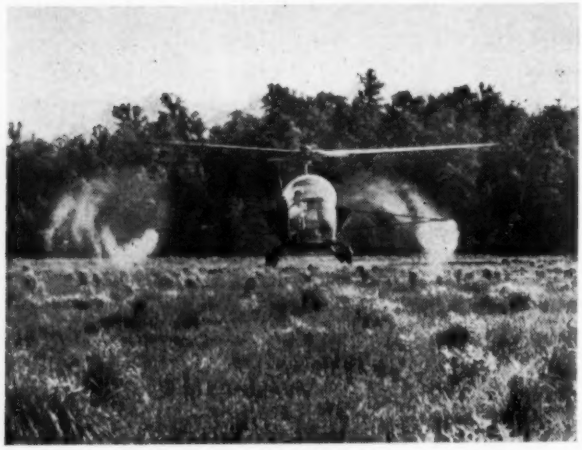
By direction of the TVA act, water control in the Tennessee Valley is undertaken "primarily for the purposes of promoting navigation and controlling floods" and to produce, transmit, and sell power "so far as may be consistent with such purposes." But the effects of water control inevitably are not limited to navigation, floods, and the generation of electric power. Water control, accomplished in the river channel by the construction of dams and reservoirs and on land through readjustments in agricultural practice and extension of forestry development, has had a significant impact on several regional health problems, one of which is the control of malaria.

In 1933, when TVA was established by Con-

Safety on the job. Employees are wearing "hard hats," goggles, respirators. Dust from extensive drilling operations is controlled as necessary by a "wet drilling" process.



Use of helicopter for larvicidal operations (Kentucky Reservoir)—an example of the newer and cheaper methods employed by TVA in the control of malaria. The helicopter is also used for power transmission line patrol during periods when larvicidal operations are not required.



gress, no one had ever heard of an integrated chain of man-made lakes with a shore line of more than 10,000 miles, which is the Tennessee River today. No one had ever envisioned the problem of malaria control on such a vast expanse of impounded water in an area where malaria is endemic. TVA's experience in the progressive development and application of new methods for the prevention and control of malaria on impounded waters is perhaps its best documented and most widely known accomplishment in the field of preventive medicine and public health.

Before TVA came into being, it had been well established that increased prevalence of malaria followed impoundment of waters in areas of the southeastern United States where malaria was endemic unless effective preventive measures were taken. A house-to-house malaria survey made in 1934 in one of the areas of northern Alabama where a TVA reservoir was under development revealed from 20 to 60 percent positive blood films, with an over-all average of about 30 percent positive. There was no escaping the conclusion that malaria was endemic in the Tennessee Valley and that its prevention and control would be a major problem.

TVA immediately accepted its moral obligation to prevent, insofar as possible, the adverse effects of impoundment of water while at the same time promoting the beneficial effects. Using as a guide such State health department regulations governing the impoundment of water as were then in existence, TVA began its program of planning and developing increasingly more effective and economic methods for preventing and controlling malaria. Planning began on the drafting boards, where the water control structures were designed in such a way as to make naturalistic control measures feasible. Other plans included clearing the reservoirs of timber, providing for marginal drainage by connecting marginal depressions with the main body of the reservoir, and developing operating bases for the application of larvicides in areas which were expected to produce the *Anopheles quadrimaculatus*.

These were the principal control measures known in 1933. Subsequent advances included refinements in methods of reservoir preparation; continuous improvements in methods of applying larvicides; development and application of new larvicides; ecological studies of *A. quadrimaculatus* larvae and adults and the establishment of more effective control of mosquito breeding through planned water level management schedules; and development of a reservoir design to facilitate mosquito control. This reservoir design involves determining areas along the margin that can be remodeled by a combination of deepening and filling and other areas that can be diked and dewatered during the mosquito season.

Through all these steps the TVA team of medical malariologist, sanitary engineer, and biologist had the cooperation and support of the official health agencies. Interest in the control of malaria beyond the zone of influence of TVA reservoirs was quick to spring up. Cooperative efforts resulted in the study of the malaria problem on a county-wide basis in all the counties of northern Alabama. Cooperative effort was also responsible for an extensive program of health education, centered around malaria transmission, in elementary schools, high schools, and teacher-training institutions in the sections of the valley where malaria was most prevalent. Time and time again the staff of the State education department, the State health department, and TVA collaborated in

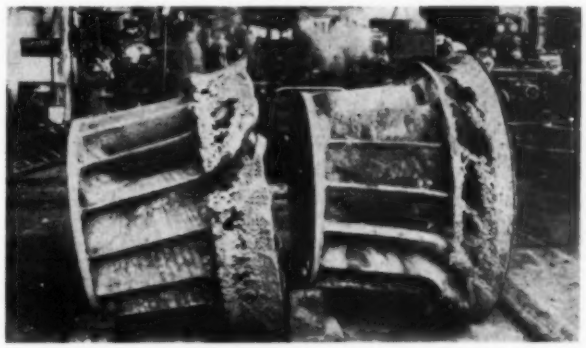
workshop, community health education programs, and demonstration activities.

Reservoir by reservoir the magnitude of TVA's control problem increased. Step by step the TVA team made headway in the improvement of old methods, the discovery of new methods, and the reduction of costs. Ideas first studied in the laboratory were taken into the field for trial if there was the faintest hope of success. Methods withstanding the preliminary field tests were put into effect on an area demonstration basis. Those proving successful there were incorporated into the program of malaria prevention and control, where they held their place only as long as they could satisfy the tests of merit and efficiency. In 1949 and 1950 malaria surveys in selected areas around the most likely mosquito-breeding locations in TVA reservoirs failed to reveal a single parasite-positive slide. Careful field investigations in 1951 and 1952 failed to produce a single case of malaria of natural indigenous origin, although they did reveal a few cases of probable Korean origin.

The general decline in malaria prevalence in the southeastern United States during recent years has relieved considerably the pressure under which TVA has had to carry on its malaria control operations, but it has not led to a relaxation of vigilance nor to false complacency. That smoldering coals of malaria prevalence have been known to flare into disastrous epidemic outbreaks is not new to epidemiologists. TVA has no desire to become newsworthy from neglect of its responsibility to prevent malaria transmission as a result of impoundments.

Remodeled reservoir margins showing filling and deepening work to facilitate malaria control (Wheeler Reservoir in northern Alabama).

Corrosion of turbines due to acid waste in Ocoee River. Pollution in this river has since been largely brought under control.

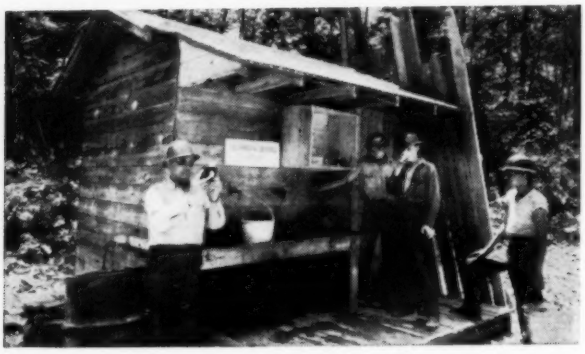


Stream Sanitation

The conversion of a flowing river into a series of impounded reservoirs and the changes in the chemical, physical, and biological characteristics of water following impoundment provide the basis for TVA's interest in stream sanitation, another regional health problem.

Man has long been torn between a struggle of conflicting stream sanitation interests: one seeking to maintain streams in their natural state of purity; the other attempting to use the streams as a convenient sewer for disposing of the end products of man's physiological and industrial processes. Somewhere a balance among the many reasonable and proper uses of water must eventually be found. Balanced use must take into consideration such items as public or industrial water supplies, fish and wildlife propagation and conservation, recreational activities, power development, flood control, erosion control, discharge of industrial wastes and domestic sewage, irrigation, and perhaps others. Development of a stream sanitation program requires identification of either limited or fundamental conflicts among different water uses, a resolution of these conflicts if possible, and the establishment of a fair, reasonable, and coordinated plan which will achieve and maintain a continuing balance among the various interests.

Safe drinking water on the job is a "must" for TVA projects. Here, a sample of water is being tested at one of the construction projects.



Since 1936, TVA has actively engaged in a program to promote the prevention and control of pollution in the Tennessee River system. The objective has been the protection and general development of the value of water as a basic physical resource of the region. At about the time interest began to crystallize into action, TVA was requested by the State health officers in the valley to undertake a fact-finding survey of the Tennessee River in order to define the pollution problem and obtain the data needed in planning for control. Organized, comprehensive information on the condition of the Tennessee River system was not available, and, furthermore, it was recognized that a program of river development would greatly alter the capacity of the stream to handle pollution.

Critical sections of the Tennessee River and its major tributaries were studied, and surveys of typical industrial plants discharging liquid wastes into the river system were made. As sections of the river system were impounded, the effects of impoundment on stream sanitation were placed under study. Analyses of industrial wastes and estimates of their effect on stream pollution in terms of population equivalents were made; the impact of domestic sewage on the pollution problem was evaluated; the biochemical oxygen demand of various wastes was studied and findings correlated with dissolved oxygen conditions and stratification phenomena in reservoirs. The data compiled can be used to draw a picture of water quality conditions in the river system as they now exist as well as some sketches of what they ought to be from the standpoint of balanced stream sanitation interests. From these data can be obtained also some outline of how the job of correction can be done and approximately how much it will cost.

Stream sanitation has been an area of very active collaboration between TVA and other Federal agencies—the Corps of Engineers, the Federal Works Agency, the Public Health Service, and the Atomic Energy Commission. In cooperation with the Atomic Energy Commission, ecological studies are being made in a small tributary impoundment which serves as a stilling basin where certain radioactive wastes are discharged. Collaboration with the Public Health Service, as well as with the States, is currently exemplified by the preparation of several reports on conditions in the Tennessee River Basin. These reports can be most useful to the Public Health Service in connection with its responsibilities under the Water Pollution Control Act of 1948 and will be a valuable aid to those whose duty it is to take corrective and preventive action.

The cooperative effort between the TVA staff and the State health departments has helped to awaken general public interest in stream sanitation in the Tennessee Valley, as evidenced by the passage of legislation relating to stream pollution control in recent years in several of the valley States and by increasing corrective action being undertaken by private industries and public agencies. The job of stream sanitation is by no means complete, however, for many troublesome spots remain. Conflicts between water use interests still exist, and many of the elusive facts concerning the effect of water impoundment on stream quality have not yet been corralled.

Other Health Problems

TVA has also been concerned with such health problems as provision of water supply and sewage disposal systems in its temporary construction villages; sanitary supervision of food-handling establishments serving construction workers living in dormitories; investigation and control of communicable diseases; provision of a safe milk supply; and sanitation of temporary housing developments and trailer camps. These needs have been met largely through close collaboration with official health agencies since

TVA is without authority except on property which it owns and controls. Where there was no organized local health unit in existence, TVA has frequently pooled its resources with those of the local area and of the State health department to help establish or strengthen a full-time local health department. As TVA construction wanes, the support of these services is in most instances being assumed by the communities and the States.

Though many of these health problems have been transitory, TVA has remained in the public water supply business on a large scale. It presently operates 30 water treatment plants at TVA dams and reservations. To the greatest extent feasible, TVA relies upon official health agencies to supervise these installations but must itself maintain a degree of surveillance over them in order to discharge its responsibility for protection of employees and the visiting public. Similarly, most of the services to recreational developments along TVA lakes have now been taken over by local health departments.

Another health problem to which TVA is giving attention is that of atmospheric pollution. In developing plans for new steam-operated generating plants to meet the increasingly urgent demands for power in the Tennessee Valley, TVA is giving careful study to the potential problem which may be associated with the discharge of fly ash, fumes, gases, and other waste materials so that necessary controls may be included to the greatest extent possible in plant design and construction.

Flexibility and Progress

The events and activities described here were not all, of course, the result of a perfect plan completely conceived in the beginning of the Tennessee Valley Authority. It is doubtful that anyone envisioned all the ramifications which have been a part of the program. Without question, a major factor contributing to TVA's success in dealing with a multiplicity of related interests has been the flexible management scheme at the heart of TVA. With authority and responsibility for leadership in the unified development of the resources of the region clearly fixed in a single agency, the many and complex technical and social problems have been boldly engaged. The result has been outstanding progress in the promotion of human welfare in the Tennessee Valley.

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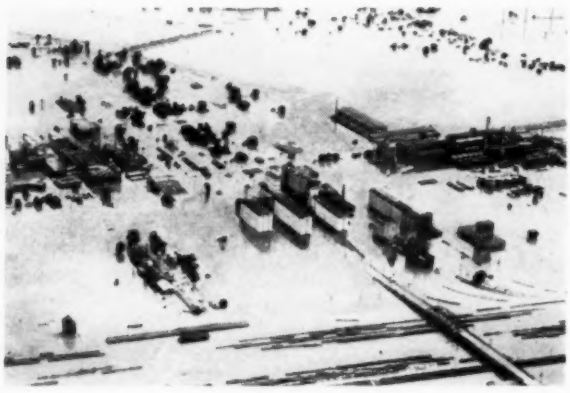
Insect and Rodent Control In Epidemics and Disasters

By JOHN S. WILEY, M.S.E., and PORTER A. STEPHENS, B.S.

VECTOR-BORNE diseases are an added hazard to humans when, in the wake of floods, storms, earthquakes, fires, and wartime destruction, insects and rodents increase in number. The public health officer should, immediately after a disaster, or when an outbreak is or may be imminent, evaluate potential hazards from insects and rodents and prepare a plan for controlling them. The danger of disease may not be confined to areas in which there has been a history of malaria, typhus, plague, dengue, or yellow fever. Fly-borne diarrheal diseases, mosquito-borne virus encephalitis, and such rodent-borne diseases as leptospirosis (Weil's disease), rickettsialpox, and lymphocytic choriomeningitis may also occur.



Mr. Wiley, a senior sanitary engineer in the Public Health Service, is assistant chief of the vector control and investigations branch of the Communicable Disease Center, where he was in charge of typhus control activities from 1945 to 1949.

Mr. Stephens, a sanitary engineer in the Reserve Corps of the Public Health Service, is with the disaster aid and facility planning unit of the Center's vector control and investigations branch. Since 1942 he has been actively engaged in malaria and typhus control and last year was consultant to the Service's regional medical directors on flood-induced mosquito problems in Nebraska, Iowa, and Utah.

Disasters often disrupt normal sanitation and public utility services and result in temporary relocation of displaced persons. Evacuation of personnel to save lives, application of first aid and medical care, and provision of shelter, safe water, and food are of first importance. Rehabilitation is next in importance to restore normal life to the community. Concerted efforts are required to remove debris and repair buildings and utilities, and to prevent the development of pests, the insects and rodents which carry diseases and seriously affect community activity.

Flies, mosquitoes, and rats, present in most parts of the United States, are hosts and carriers of many diseases in aftermaths of disasters. Especially as flood waters recede, these insects and rodents may multiply in unprecedented numbers.

A number of vector-borne diseases may occur in epidemic proportions, particularly after a build-up of the vector populations following a disaster (see table).

The potential build-up of the insect and

Collapsed building and debris resulting from floodwater.

Disposal of flood damaged meat.

rodent vectors depends upon a number of factors: the type and magnitude of the disaster; its geographic location; the season of the year; and existing control measures or the timing of emergency measures for combating the pests.

Fires, floods, and other disasters may temporarily reduce rather than increase the numbers of vectors and pests by killing them or destroying their breeding and harborage areas. However, disasters generally increase the breeding potentials by creating larger breeding and harborage areas. Midwest floods in the summer of 1951 and in the spring of 1952 created extensive water areas suitable for mosquito breeding and left volumes of organic matter in which flies and rats could develop in large numbers.

The geographic location of the disaster area is, of course, a factor determining the danger from specific vector-borne diseases. Malaria, typhus, dengue, and yellow fever would not be expected to develop to epidemic proportions in northern sections of the United States. This may be due to a lack of host or vector, to the absence of infection among inhabitants, or to other conditions which prevent these diseases from spreading. *Anopheles* mosquitoes, *X. cheopis* fleas, and rats all exist in these sections of the country, but their presence would not be expected to result in an epidemic threat of the tropical or semitropical diseases. In southern areas, however, malaria and typhus would be real threats. If a source of infection were introduced, plague, yellow fever, and dengue could break out. Pestiferous insects and rodents may develop in large numbers following a disaster in almost any part of the United States.

The season of the year greatly affects the ex-

Entomologist surveying residual floodwater for mosquito production.

Space spraying of insecticides for fly control.

tent to which vectors and pests develop. Certain fly and mosquito species have short breeding seasons, particularly in the North where normally they do not develop intensively. However, myriads of insects may develop following a disaster during the breeding season, no matter how short it may be.

Whether insect or rodent control measures are warranted, following disasters or during epidemics, depends upon the factors discussed. The period of development may be from 7 to 10 days in the case of mosquitoes and flies. It is therefore essential that entomological surveys and plans should be made as soon as possible after a disaster in order to have personnel, equipment, and materials available as the problem develops.

In a public health insect or rodent control emergency program following a disaster, whether it be to control an epidemic or to prevent disease and discomfort, the State health officer or his designated representative functions as coordinator of all health activities within the State. If the assistance of the Public Health Service is desired, it should be requested of the appropriate Public Health Service regional office by the State health officer. All insect and rodent control measures should be coordinated to secure efficient program supervision. Chemical control measures may vary for each insect or rodent group. Control by sanitation is equally as important as chemical control and may effectively and simultaneously reduce the number of types of vectors. The entire activity should be supervised by a single individual competent in this field of work.

Three brochures have recently been issued by the Communicable Disease Center of the Public Health Service on fly, mosquito, and rodent control in epidemics and disasters (*1–3*). They deal in some detail with the various recommended control measures which in this article are considered only in a general way.

Fly Control

Required conditions for fly control may be summarized as: (*a*) during an epidemic of diarrheal disease in an area which has a large fly population or where seasonal breeding will soon begin; (*b*) following a disaster which occurs during or just at the beginning of the fly-breeding season and which has disrupted the sanitation facilities for disposal of fecal matter and other organic wastes; and (*c*) under particular conditions related to diseases where transmission by flies is possible.

The health menace and discomfort from flies result from lack or failure of sanitation facilities; therefore, augmentation of these facilities is of primary importance. Vehicles and manpower should be made available at the earliest opportunity for sanitary storage, collection, and disposal of accumulated human excrement and other organic wastes resulting from a disaster. For the control of diarrheal diseases, flies should be excluded from excreta and from human food, which indicates the need for fly-proof disposal pits and for screening of temporary and per-

Disease	*Source of infection*	*Vector*
Malaria	Man	*Anopheles quadrimaculatus.* *Anopheles freeborni* *Anopheles albimanus.*
Dengue	Man	*Aedes aegypti.*
Yellow fever	Man	*A. aegypti.*
Virus encephalitis	Bird, possibly horse	*Culex tarsalis* and other mosquitoes.
Diarrhea and dysentery	Man	Domestic flies and rats.[1]
Murine typhus fever	Rats	*Xenopsylla cheopis* (fleas).
Plague	Rodents, man	*X. cheopis* and other fleas.[2]
Lymphocytic choriomeningitis	House mouse	Possibly arthropods occasionally.[1]
Rickettsialpox	House mouse	*Allodermanyssus sanguineus* (mite).
Leptospirosis	Rats, less often dogs	([3]).

[1] Transmission also through contaminated food or dust. [2] Also transmissible from man to man. [3] Transmitted through the skin, or water contaminated with rat urine or feces.

Adult and larval stage flies produced from animals drowned by flood.

Mixing poison bait for rodent control

manent food-handling establishments. Despite the efficacy of improvised methods to restore sanitation facilities, it is probable that the use of chemicals will be required to (a) supplement the sanitation effort, or (b) abate fly populations until adequate sanitation is restored.

Mosquito Control

In mosquito-borne disease transmission, initial control measures should be directed against adult mosquitoes as the quickest means of intercepting the course of the epidemic. Residual spraying with a DDT formulation on interior surfaces of occupied dwellings, and sometimes of outbuildings, will effectively destroy the house-frequenting species of recognized disease vectors. Space spray measures may be indicated in certain instances. Larviciding may be necessary to prevent the development of further broods following a disaster.

The current epidemic of mosquito-borne encephalitis in the Central Valley of California furnishes a striking example of the importance of emergency mosquito control measures.

Rodent Control

In the event of a rodent-borne disease transmitted by arthropods, control of the fleas or mites is of first importance. DDT dust applied to rat runs and harborages will effectively reduce the ectoparasites. Rat poisoning is applied to control the rats after the DDT has had an opportunity to kill the ectoparasites. With warfarin, the poison and DDT may be applied concurrently. In the case of diseases transmitted from rat to man without vectors, rat poisoning is instituted immediately without previous insecticide application. If rodents already heavily infest the area, it is important that a relatively quick-acting poison be used before attempting to clean up and restore sanitation. If rats have migrated or concentrated in the disaster area, it may be necessary to move the people to a rat-free area. Finally, the removal of rubbish and debris, and the proper storage and disposal of garbage will deprive remaining rats of food and shelter.

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The Positive Approach To a Tuberculosis Nursing Program

By DORIS E. ROBERTS, R.N.

THE MODERN attack on tuberculosis has made tangible inroads on the control of this disease and gives us reason to look forward to the day when tuberculosis will no longer be a major public health problem. The decline in the tuberculosis death rate, from 45.8 per 100,000 population in the United States in 1940 (*1*) to 22.5 in 1950 (*2*), is one evidence of change for the better. We are discovering an increasing number of cases in the earlier stage of the disease; we have more hospital beds for tuberculosis patients than ever before; treatment methods are improving; and rehabilitation services are expanding. Health workers can have a more optimistic attitude toward tuberculosis control today than they could even as recently as 1940.

But we must remember that as the problem itself is lessened, the challenge it presents to health workers is intensified. This means that we must evaluate what we are doing in terms of productive action and revise our thinking and procedures to conform to modern concepts.

Administrative Policies

How can nursing programs be adapted to fit this changing pattern of tuberculosis control?

Miss Roberts, nurse officer with the Division of Chronic Disease and Tuberculosis, Public Health Service, presented this paper at the annual meeting of the Philadelphia Tuberculosis Conference, October 31, 1952.

The positive approach to tuberculosis problems calls for enlightened administrative policies. Policies for tuberculosis control must be flexible enough to permit individual evaluation and application to each family situation. They must also change as changes occur in the needs of the patient and the community. They must give practical consideration to the available personnel and facilities to assure beneficial and economical use of all services. This is possible only when plans are made jointly by all those responsible for the various activities of tuberculosis control. For example, some health departments have been able to establish the policy that at least one public health nursing visit be made to the home of every reported new case of active tuberculosis. Such a policy affects many relationships and services of the health agency. Therefore, before a policy is established its need and broad implications must be considered by the health officer, the tuberculosis control officer, and the public health nursing director. They must make certain that the policy conforms to the responsibilities and objectives of the agency, and, simultaneously, they must make plans for it to be carried out.

Many more public health nurses are needed to meet community demands for nursing services in the home. With services for home care and care of the chronically ill expanding, we can expect the demand for nursing services also to increase. This means that policies regulating the discharge of patients from nursing service are as important as those relating to the admission of patients for care. Plans for care must give consideration to the laws of learning

so that the most intensive nursing service is brought to the family at the time the family's desire and need for learning is greatest. Work responsibilities given nursing personnel must be carefully evaluated in order to assure the best use of the education and skills of professional nurses.

Serious shortages in nursing personnel are frequently reported by tuberculosis hospitals. Yet in these hospitals it is not infrequently found that personnel policies lag behind those in the local general hospitals and health agencies, that facilities are inadequate for the protection of hospital personnel, and that the limited amount of professional nursing time is being used in the housekeeping, pharmacy, and dietary departments. Solution of these problems requires intelligent planning at the administrative level.

National organizations and committees have recognized some of the common administrative problems and have made recommendations for their solution. The Tuberculosis Nursing Advisory Service recently published "Cues to Staffing Tuberculosis Units in Hospitals" (*3*), which should help hospital nursing administrators to evaluate and plan for nursing service to patients. The American Trudeau Society has appointed a committee to study the hazards involved in tuberculosis nursing. We can look for the recommendations of this committee to assist us to make sound plans for the protection of patients and hospital personnel from tuberculosis infections. A subcommittee of the American Public Health Association's Committee on Administrative Practices is developing a guide for the medical and public health nursing supervision of tuberculosis cases and contacts (*4*), which should assist health departments in selecting tuberculosis families in need of nursing service and in determining the amount of service they need.

These guides are administrative tools which must be adapted to meet local needs and situations, if they are to be used effectively.

Coordination of Services

Included among the community resources which contribute to the effectiveness of nursing in general, and tuberculosis control are the medical care, social welfare, and rehabilitation facilities. It is important to bring these services into their appropriate supportive relationship with the agencies responsible for tuberculosis control. Through such coordination we can stimulate new interest and more active participation on the part of individuals and agencies unaware of their responsibilities in the tuberculosis control program. And, more important, we can find renewed vigor in attacking this disease. For example, many general hospitals are participating in case-finding activities by X-ray examinations of all clinic and hospital admissions, a group with a high incidence of tuberculosis. Many hospitals which previously refused to admit tuberculosis patients are now taking a more realistic view of their part in tuberculosis control. They are admitting tuberculosis patients and giving them at least immediate care until provisions can be made for long-term care. Also, because the hospitals identify the tuberculosis cases, they can carry out appropriate isolation procedures to prevent the spread of the disease to other patients and to hospital personnel.

In many areas tuberculosis hospitals and health departments are coordinating their efforts so that patient care is becoming an unbroken course from the point of discovery of the disease to complete rehabilitation. To assist in the coordination of services, some health departments employ personnel who work as liaison between the hospital and public health agencies. And some health departments have revised interagency transferral forms to include more comprehensive information about the patient and family so that patient supervision and care can be better integrated.

Nursing Education and Service

Just as good administration and coordination of services are essential to a positive nursing program, so is the provision of nursing consultation. The activities of the tuberculosis nursing consultant may vary considerably but should always include participation in the program planning and in the evaluation of services. She is the technical adviser and therefore should be able to see the many activities of

nursing in their proper perspective to the total control program. Thirty-four States now have tuberculosis nursing consultants, six of whom have extended their consultation services to hospitals as well as to public health agencies (*5*). In many instances it has been the nursing consultant who has been instrumental in bringing about improved services for patient care, broadened and intensified nursing education in tuberculosis, and improved clinic facilities. She has also helped to resolve inconsistencies in nursing practices in the hospital and in the home.

Our modern tuberculosis control program demands good supervision. In this the nursing supervisor (the public health nursing supervisor or the head nurse in the hospital) makes her important contribution. Her function is to make certain that the program is carried out as planned. She is the middleman between the director and the staff nurse. Through her interpretation of the staff nurse's problems she brings a realistic and practical approach to the director. In her work with the staff she is part educator, administrator, and adviser. Through her, skilled nursing care is provided to the patient and family.

The education of the student and graduate nurse in tuberculosis nursing has often been too limited or lacking. Recognizing that every nurse needs preparation in this field of nursing, schools of nursing are revising their curriculums to meet this need. A report of the Joint Tuberculosis Nursing Advisory Service (*6*) showed that 39 percent of all schools of nursing are now including tuberculosis nursing in the curriculum. We still have a long way to go. Education is basic to service, and we cannot be satisfied until all schools of nursing include clinical experience in tuberculosis with classroom instruction. This will be possible when more general hospitals accept tuberculosis patients and recognize every patient as an opportunity for student experience; when more tuberculosis hospitals are prepared to offer affiliation programs to schools of nursing; and when more public health agencies are able to accept students for field experience. To make up deficiencies in student nurse education, States have sponsored tuberculosis nursing work conferences and have offered this educational program to all nurses in the State. These institutes have been sponsored jointly by tuberculosis associations, nursing organizations, and health departments. They not only have contributed to nursing education but have also made it possible for nurses in all areas of work to come together and think through their responsibilities in tuberculosis control.

Finally, it is the staff nurse—in the hospital, the public health agency, the school, the doctor's office, and industry—who gives direct service to the patient, the family, and the community. The effectiveness of the nursing service ultimately rests with her. And she can bring skillful, understanding, complete service to the community in which she works only if she has the security which comes with adequate professional preparation, well-planned supervisory and consultative guidance, and good administrative policies, and only if there are those other facilities and services available in the community which are essential to total patient care. Working within this framework, the staff nurse effectuates a positive approach to tuberculosis nursing.

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Capillary Tube Technique For Serologic Screening Of Syphilis

By CHARLES R. FREEBLE, JR., M.D., M.P.H., and BERTTINA ORSBURN, B.S.

THE NEED for a simplified method of obtaining blood specimens has been indicated by field observations in the venereal disease control program of the Ohio Department of Health. Obtaining blood by venipuncture is difficult on infants and small children, is objectionable to many adults, and is not suitable for use in the home. For these reasons we have been searching for a method of collecting capillary blood which would give laboratory results of significance.

A number of methods for the collection of small amounts of blood have been tried in the past, especially in pediatric work. The capillary tube collection method as reported in this paper was described by Davies (*1*) in 1938, and has been in use for several years in various pediatric hospitals, including Children's Hospital in Columbus, Ohio. It is surprising to us that this technique has not been applied more widely to public health work as it appears to have advantages over venipuncture for mass studies as well as for work with infants and children.

Method of Collection

The tubes used for collection of blood are cut in 8-cm. lengths from strong-walled glass tubing of approximately 2-mm. inside diameter, 4-mm. outside diameter, and 1-mm. wall thickness. These 8-cm. tubes hold approximately 0.4 ml. and can readily be filled two-thirds or three-fourths full by capillary action with blood from finger puncture, or from heel puncture on infants. The ends of the tubes are capped with No. 3 –68 M. S. rubber vial stoppers which fit snugly on this diameter tubing, seal the tube well, and protect it from breakage if dropped. This length tube fits an ordinary mailing container and can be safely transported to the laboratory in a routine way.

The finger or heel is cleaned with alcohol, wiped dry, and a fairly deep stab made with a Bard-Parker No. 11 blade mounted in a cork. The capillary tube is filled with blood as described by Davies (*2*), holding the tube horizontally or tipped slightly downward, and allowing the blood to run into the tube by capillary action. It is not difficult to obtain the necessary amount of blood if the finger is wiped completely dry at the beginning, gentle pressure applied to allow the blood to well out in large drops, and the end of the tube touched to the drop of blood. The tube should not be held against the skin of the finger as this tends to let the blood run down the finger. When filled, the tube is capped at both ends with the vial stoppers. The tubes are numbered with 1-inch Scotch "Wetordry" masking tape No. 202 stamped with a Bates numbering machine. This tape does not loosen or come off in the water bath nor do the stamped numbers, when once dried on the tape, run or fade in the water.

Method of Testing

Before the tubes are placed in the centrifuge, blood clots are loosened with a strong wire 6 to 7 inches in length, and the tubes are then centrifuged at 2,000 rpm for 10 minutes. Following centrifugation, the entire specimen is inactivated in a water bath at 60°–62° C. for 3 minutes. It is not necessary to separate the serum from the clot for inactivation, and handling the blood in this manner conserves the serum and saves time in operation. The tubes are divided into lots of 10 in 250-cc. beakers, and the beakers are filled with water from the water bath to a level which covers the serums. The beakers are then placed in the water bath for inactivation. If the vial stoppers on the ends of the tubes are sufficiently tight no water enters even if the water level in the beaker is above the tops of the tubes.

When removed from the water bath, the tubes

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Table 1. Comparison of results of capillary VDRL test with Kahn, Kline, and Kolmer tests

Capillary VDRL	Positive and doubtful		Negative		Agreement (percent)	Disagreement (percent)
	Kahn					
	Number	*Percent*	*Number*	*Percent*		
Positive and weakly positive	403	64. 7	98	15. 8	82. 9	17. 1
Negative	8	1. 3	113	18. 2		
	Kolmer					
Positive and weakly positive	469	75. 4	33	5. 3	90. 8	9. 2
Negative	24	3. 9	96	15. 4		
	Kline					
Positive and weakly positive	494	79. 5	7	1. 1	94. 1	5. 9
Negative	30	4. 8	91	14. 6		

are set out in drilled wooden racks. Divided racks with separated shelves do not work well with these capillary tubes, as the flanges on the vial stoppers tend to catch and pull off when the tubes are put in and taken out of the rack.

Sixteen-gauge glass capillary tubing (approximately 2-mm. outside diameter) in 6-inch lengths, holding 0.2 ml. serum, is used to remove the serum from the collecting tube. With a red wax pencil, a mark is placed 1.5 inches from the end of the tube to measure 0.05 ml. serum for the VDRL test. Some workers consider this length tubing difficult to handle. A shorter length, such as 3 inches, may be used. Sixteen-gauge tubing fits snugly into the smaller opening of a vaccine bulb (for example, bulbs used with smallpox vaccine sets). Using a vaccine bulb, a suction apparatus may be improvised to aid in withdrawing serum from the collection tube. The large opening in the vaccine bulb snugly fits the end of a small glass adapter (7-mm. outside diameter). Attaching a rubber dropper top from an ordinary typing serum bottle to the other end of the adapter completes the apparatus. Other workers have nicknamed this set-up a "squee-gee." With a squee-gee and marked tubing, 0.05 ml. of serum is removed from each sample and placed in a depression of a Boerner micro slide or paraffin ring slide (*3*).

The antigen is prepared and used as in the standard VDRL technique (*4*), one drop of antigen from a tuberculin syringe with a 22-gauge needle (1/60 ml.) being added to each serum sample. The plates are then rotated for 4 minutes at 180 rpm on the Boerner rotator. Tests are read as positive, weakly positive, or negative as described in the VDRL technique.

Results

Venous and finger puncture blood specimens were collected simultaneously from 622 patients and employees of the Central Ohio Rapid Treatment Center. Standard Kahn, Kline, Kolmer, and quantitative Kahn tests were done by the laboratory of the Ohio Department of Health on the venous bloods. Capillary VDRL tests on the finger specimens were done at the rapid treatment center.

Of the 622 bloods tested, 397 (63.8 percent) gave positive results with all methods used, 91 (14.6 percent) gave negative results, and 134 (21.6 percent) showed varying disagreement. Table 1 compares the results of the capillary VDRL test with the results obtained from the Kahn, Kline, and Kolmer tests. Best agreement was obtained with the Kline tests.

Complete disagreement occurred in results of tests on 134 serums: The capillary VDRL test

Table 2. Diagnostic status of individuals tested by the capillary VDRL tests and by other methods

Capillary VDRL negative Kline, Kolmer, Kahn, positive		Capillary VDRL positive Kline, Kolmer, Kahn, negative	
Diagnosis	Number of cases	Diagnosis	Number of cases
Early latent, with treatment	2	Primary, darkfield positive	2
Late latent	1	Early latent, with treatment	1
Late latent, with treatment	3	Late latent, with treatment	2
No venereal disease	1	Chancroid	1
Total	7	Total	6

and the other three tests in 13; the Kline in 7; the Kolmer in 6; and the Kahn in 72. On 36 of the 134 specimens, two of the tests were positive and two were negative. Table 2 presents the diagnostic classification of the 13 individuals whose serums when tested by the capillary VDRL were in total disagreement with the other tests.

Five hundred and forty-three (87.3 percent) of the 622 individuals tested were diagnosed syphilitic and 79 (12.7 percent) nonsyphilitic. The capillary VDRL was positive in 499 (91.9 percent) of the 543 diagnosed cases and negative in 77 (97.5 percent) of the 79 nonsyphilitics. Of the 44 syphilitics whose blood was negative to capillary VDRL, 32 were previously treated patients; 9 had primary syphilis; 2 late latent, and 1 central nervous system involvement.

Results of the various tests on the 622 patients and personnel at the Central Ohio Rapid Treatment Center, by syphilitic status, are presented in table 3.

Serums of three individuals among those diagnosed as nonsyphilitic gave positive tests. Two of these had diagnoses of apparent false positive serologic reactions due to recent immunizations. The third had chancroid, with a further diagnosis of possible primary syphilis, the final diagnosis depending upon further study.

Primary syphilis was the diagnosis in 32 individuals in the series. Of these, 12 were positive and 13 were negative to all tests. Of the seven remaining, six were positive to the capillary VDRL test. Table 4 presents the results of the four test methods on the seven patients having primary syphilis, when test results did not agree completely.

From these results, it appeared that capillary blood collected and tested in the manner described gave results which compared favorably with the results of standard serologic tests on venous blood.

There remained the problems of investigating the suitability of the collection method for mass

Table 3. Comparative results of battery tests, by syphilis status

Result of test	543 diagnosed syphilis								79 diagnosed not syphilis							
	Capillary VDRL		Kahn		Kline		Kolmer		Capillary VDRL		Kahn		Kline		Kolmer	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Positive and weakly positive	499	91. 9	----	----	----	----	----	----	2	2. 5	----	----	----	----	----	----
Positive and doubtful	----	----	409	75. 3	523	96. 3	490	90. 2	----	----	2	2. 5	2	2. 5	1	1. 3
Negative	44	8. 1	134	24. 7	20	3. 7	53	9. 8	77	97. 5	77	97. 5	77	97. 5	78	98. 7

Table 4. Comparative results of battery tests on 7 patients with primary syphilis

Capillary VDRL	Kahn	Kline	Kolmer
Weakly positive	Negative	Doubtful	Negative.
Positive	do	Negative	Do.
Do	Positive	Positive	Do.
Negative	Negative	Doubtful	Do.
Weakly positive	do	Negative	Do.
Positive	do	Positive	Positive.
Do	do	do	Do.

testing and of determining the time necessary for a person untrained in this technique to develop proficiency in securing specimens.

By arrangement with the Zanesville City Health Department, Zanesville, Ohio, the collection technique was used in a mass survey conducted by that department among students of the two local high schools as a part of their health course. A team consisting of the junior author, two physicians, and two nurses who had never before used the method secured blood specimens from 1,106 students. The inexperienced collectors developed proficiency after collecting approximately 25 specimens and only 3 of the 1,106 specimens were later found unsatisfactory for testing. Six positive and weakly positive results were obtained, and follow-up observations disclosed three previously undiagnosed, untreated students with congenital syphilis, one who had been previously diagnosed and treated, and two with seemingly false positive reactions, who are still under study. Following this, 94 children in a Columbus Children's Home were tested. Their ages ranged from 4 to 12 years, and all tests were negative.

Somewhat more time was required to obtain specimens by capillary tube than by venipuncture, but when the time consumed in preparing and sterilizing venipuncture equipment was considered, the time differential disappeared.

Discussion

The method of collecting capillary blood specimens described here, which is essentially the same as that reported by Davies in 1938 (*1*), may be useful in a venereal disease control program. Using the VDRL test, significant results were obtained on 622 specimens when evaluated according to the stage of syphilis in the persons tested. Field experience in which 1,106 specimens were collected demonstrated the technique to be efficient and economical. Experience with 94 children has demonstrated the advantages of this technique over venipuncture.

Summary

1. A method for collecting capillary blood and testing for syphilis has been discussed. The method combines the advantages of collection by finger puncture and adequate laboratory results.

2. It is suggested that the method can become a useful tool in venereal disease control programs, particularly in regard to the screening of infants and children.

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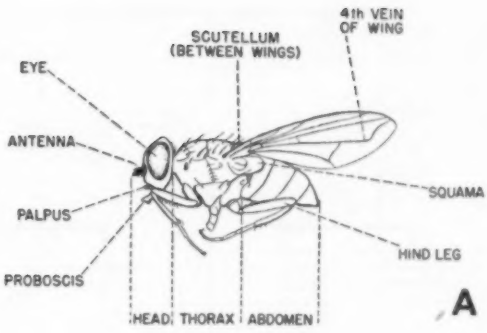
Identifying Common Flies

By HAROLD R. DODGE, Ph.D.



Much of the entomological literature on fly identification is difficult and expensive to obtain. However, the various species of domestic flies in the United States have distinguishing characteristics that workers who lack professional entomological training may learn to recognize. This article is especially designed for the information of personnel engaged in survey and control operations in which large numbers of specimens are involved and the principal objective is measurement of fly densities. Some remarks on zoological terminology and the use of keys are included to aid those not experienced in insect identification. Copies of the two keys on fly identification mentioned in the article and the other available pictorial keys may be obtained by writing the Officer in Charge of the Communicable Disease Center, Public Health Service, Atlanta, Ga.

DURING THE past 6 years, the Communicable Disease Center of the Public Health Service has prepared a series of pictorial keys to facilitate the recognition of insects and other arthropods of medical importance. Two keys have been prepared for the identification of flies. One, the "Pictorial Key to Common Domestic Flies in the U. S.," separates 21 species of common flies, many of which are widely distributed in other parts of the world. The other, the "Pictorial Key to Principal Families of Diptera of Public Health Importance," separates 24 families of Diptera (two-winged insects including such common types as flies, mosquitoes, gnats, and midges). This technical key, however, is not essential for the recognition of many common species of domestic flies.

In scientific practice, each kind of organism is given two names. For example, the common housefly is called "*Musca domestica.*" *Musca* is the generic name and *domestica* the specific name. Generic names are always capitalized; specific names are not; both are italicized. Sometimes, when the generic name is mentioned previously, it is abbreviated to the first letter followed by a period, for example, *M. domestica.* In the accompanying pictorial key, some of the generic names are followed by "spp." An example is *Sarcophaga* spp. This means that more than one species occurs within the genus *Sarcophaga* but that the key does not separate the species. Often the name or an abbreviation of the name of the person who described the species is given after the specific name. For

Dr. Dodge, an entomologist with the Communicable Disease Center of the Public Health Service, is engaged in research work on flies.

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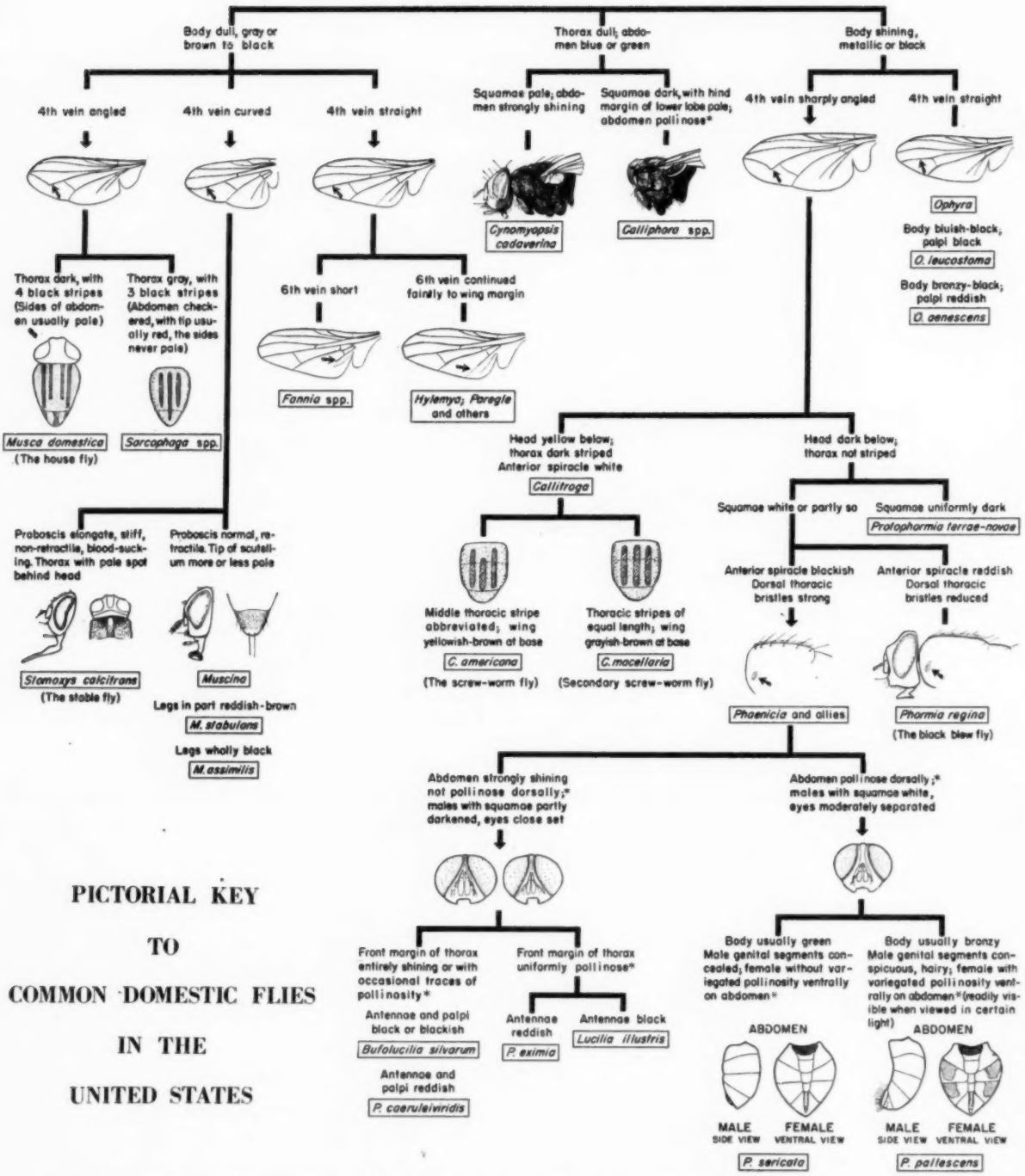

Body dull, gray or brown to black
Thorax dull; abdomen blue or green
Body shining, metallic or black
4th vein angled
4th vein curved
4th vein straight
Squamae pale; abdomen strongly shining
Squamae dark, with hind margin of lower lobe pale; abdomen pollinose*
4th vein sharply angled
4th vein straight
Cynomyopsis cadaverina
Calliphora spp.
Ophyra
Body bluish-black; palpi black
O. leucostoma
Body bronzy-black; palpi reddish
O. aenescens
Thorax dark, with 4 black stripes (Sides of abdomen usually pale)
Thorax gray, with 3 black stripes (Abdomen checkered, with tip usually red, the sides never pale)
6th vein short
6th vein continued faintly to wing margin
Musca domestica
(The house fly)
Sarcophaga spp.
Fannia spp.
Hylemya; Paregle and others
Head yellow below; thorax dark striped Anterior spiracle white
Callitroga
Head dark below; thorax not striped
Proboscis elongate, stiff, non-retractile, blood-sucking. Thorax with pale spot behind head
Proboscis normal, retractile. Tip of scutellum more or less pale
Middle thoracic stripe abbreviated; wing yellowish-brown at base
C. americana
(The screw-worm fly)
Thoracic stripes of equal length; wing grayish-brown at base
C. macellaria
(Secondary screw-worm fly)
Squamae white or partly so
Squamae uniformly dark
Protophormia terrae-novae
Stomoxys calcitrans
(The stable fly)
Muscina
Legs in part reddish-brown
M. stabulans
Legs wholly black
M. assimilis
Anterior spiracle blackish Dorsal thoracic bristles strong
Anterior spiracle reddish Dorsal thoracic bristles reduced
Phaenicia and allies
Phormia regina
(The black blow fly)
Abdomen strongly shining not pollinose dorsally;* males with squamae partly darkened, eyes close set
Abdomen pollinose dorsally;* males with squamae white, eyes moderately separated
Front margin of thorax entirely shining or with occasional traces of pollinosity*
Front margin of thorax uniformly pollinose*
Antennae and palpi black or blackish
Bufolucilia silvarum
Antennae reddish
P. eximia
Antennae black
Lucilia illustris
Antennae and palpi reddish
P. caeruleiviridis
Body usually green Male genital segments concealed; female without variegated pollinosity ventrally on abdomen*
Body usually bronzy Male genital segments conspicuous, hairy; female with variegated pollinosity ventrally on abdomen* (readily visible when viewed in certain light)
ABDOMEN
ABDOMEN
MALE SIDE VIEW
FEMALE VENTRAL VIEW
MALE SIDE VIEW
FEMALE VENTRAL VIEW
P. sericata
P. pallescens

PICTORIAL KEY TO COMMON DOMESTIC FLIES IN THE UNITED STATES

*"Pollinose" refers to a whitish dusting of a surface caused by microscopic hairs.

example, the name of the common housefly may be followed by the name "Linnaeus," sometimes abbreviated Linn. or L.

A family constitutes a group of related genera. For example, the family "Muscidae" includes *Musca*, *Muscina*, *Ophyra*, *Stomoxys*, and related genera. Sometimes unrelated genera superficially resemble each other closely. On the other hand, members within one family may be quite diverse in general appearance. Thus, it is much simpler to recognize the housefly than to recognize its family characteristics. In fly control operations, the family name of a fly is of secondary importance; therefore, only the material in the "Pictorial Key to Common Domestic Flies in the U. S." is presented here.

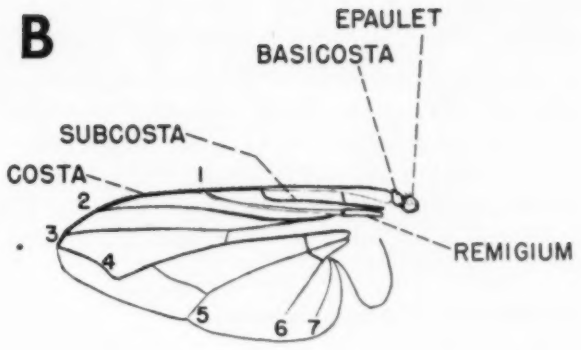
Use of the Key

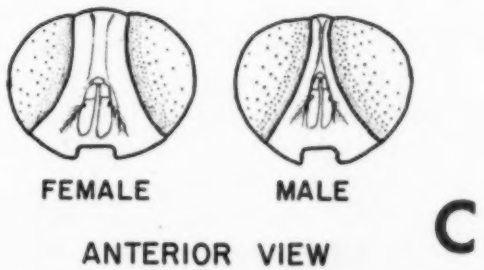
Identification keys are merely guides used to distinguish between closely related species. The most common type of key consists of a series of choices or "couplets," each containing two or more alternatives; each alternative refers the user to a succeeding couplet until the specimen under consideration is keyed or "run out" to a certain identity or name. In pictorial keys, most or all of the characteristics used in the couplets are illustrated.

In using the pictorial key shown, the general coloration of the body must first be determined. The housefly, for example, belongs in the gray-bodied group at the left. Three subdivisions of this group are based on the structure of the fourth wing vein. It can be observed even by the naked eye that this vein, which in many species ends behind the wing tip, is abruptly angled (not gradually curved) and ends before the wing tip, close to the end of the third wing vein. The presence of four dark stripes on the thorax and the usual yellowish coloration of the abdomen sets it apart from the various species of *Sarcophaga*.

Identifying another common fly, *Phaenicia sericata*, is not as simple. The uniformly greenish-colored body refers it to the group of species on the right side of the key. It will not be difficult to observe that the fourth vein is again abruptly angled or that the thorax is without obvious dark stripes, so it readily keys past *Ophyra* and *Callitroga*. But its separation from the remaining genera and species is rather difficult. The whitish squamae (see fig. A of whole fly for location of this structure) and lack of a reddish spot on the side of the thorax (see arrow in key illustration) will put it with "*Phaenicia* and allies." The dorsal pollen of the abdomen gives it a duller color than the very bright, shining abdomen of most species of this group, but if the specimen is of the male sex, in which the pollen is less evident, it is useful to check the color of the squamae and the width of the interocular space (see illustration at this point in the key and fig. C). *Phaenicia sericata* can be separated from the remaining species, *Phaenicia pallescens*, by its usual greenish color and the other characteristics shown in the key.

As familiarity with the various flies increases there will be less and less need to refer to the key. The observer may even notice that some flies have prominent differences not mentioned in the key. For example, *Phaenicia* and allies





are brighter colored than *Phormia* and *Protophormia*. In a key of this type, it is, of course, impossible to give all the outstanding characteristics. Some additional information on the various species follows. But it is advisable during the initial identification work to send representative determined specimens of all species to a specialist for confirmation.

Features of Common Species

Calliphora spp. and the allied species, *Aldrichina grahami*, a native of Asia now well established in California and Arizona, and *Eucalliphora lilaea*, a common western species that is rare in the East, are quite easily recognized by the narrow, crescent-shaped, white margin of the lower squamal lobe. The identification of most species in this group is difficult, but two common species can be recognized as follows: *Calliphora vicina* (formerly called *erythrocephala*) has cheeks which are mainly reddish, and it has a reddish anterior thoracic spiracle; *Calliphora vomitoria* has a "beard" of reddish-yellow hairs on the lower hind margin of the head. The species of the *Calliphora* complex are common in the Northern Hemisphere in the spring and fall. In the southern States they occur chiefly in the winter months. They breed primarily in dead animal matter.

Callitroga americana and *Callitroga macellaria* range from Argentina to northern United States. They are very similar in general appearance but differ in habits. *C. macellaria* is a common fly over the greater portion of its range. It is readily attracted to traps and breeds in dead animal matter. *C. americana*, the "screw-worm" fly, is a primary parasite of mammals; its larvae occur in wounds and natural body orifices. Generally, it is larger in size than *C. macellaria* and the legs are usually nearly black. *Paralucilia wheeleri* is a western species which strongly resembles the two species of *Callitroga*, but it is distinguished from them by its dark brown squamae and longer palpi.

Cynomyopsis cadaverina is a common northern species allied to *Calliphora* and similar to that genus in habits and seasonal distribution. It is easily recognized through the nearly uniform white squamae which contrast sharply with the dark body, and by the more strongly shining abdomen which in both sexes is more pointed.

Fannia spp. are moderately small, grayish or brownish flies, sometimes marked with yellow. Certain species are black and shining, but they never approach the highly polished black of *Ophyra*. *Fannia canicularis* is commonly known as the "little housefly" and *Fannia scalaris* as the "latrine fly." The sixth wing vein of *Fannia* is short and the seventh is sufficiently curved so that the two would, if continued, intersect before they reach the wing margin. *F. canicularis* and *F. scalaris* are nearly cosmopolitan in distribution, breeding in moist material of plant or animal origin.

Hylemya cilicrura and *Paregle cinerella* are two common examples of the Anthomyiinae, a subfamily characterized by the continuation of the sixth vein, though faintly, to the wing margin, and by the presence of fine, erect hairs subapically on the under side of the scutellum. In *H. cilicrura* the female has a characteristic reddish spot above the base of the antennae, and in the male the abdomen, viewed laterally, is quite flat. In *P. cinerella* the head usually is entirely black, and the male abdomen is not greatly flattened. Both species breed in vegetable matter, and they and allied species are sometimes important pests of crops. They are widely distributed in the United States.

M. domestica, the "housefly," is easily recognized by the characteristics mentioned in the key, and there are few other American flies which might be confused with it. These are, primarily, *F. canicularis*, *Stomoxys calcitrans*, and *Muscina*. In other parts of the world there are many species of the genus *Musca*. *M. domestica* breeds in garbage, vegetable matter, or excrement of herbivorous animals, and is widely distributed throughout the world.

Muscina stabulans, the "false stablefly" and *Muscina assimilis* are widely distributed species, both probably originating in the Old World. They are well-marked species, somewhat larger than the housefly, and have a moderately curved fourth vein. They breed primarily in plant and animal wastes where their larvae may prey upon other fly larvae. Two allied, larger species are relatively new to North America, *Muscina pascuorum* and *Muscina pabulorum*. They are distinguished from *M. assimilis*, which they

otherwise resemble, by their larger size, the reddish palpi (not black), and by the strongly curved fourth vein, ending in or before the wing tip.

Ophyra aenescens and *Ophyra leucostoma* are easily recognized by the highly polished, shining black body. *O. aenescens* is bronzy-black with yellowish squamae, while *O. leucostoma* is bluish black with dark squamae. The difference in body color between these two species, though slight, is remarkably constant. Both species are widely distributed in the United States; they apparently prefer to breed in animal matter.

Phaenicia and the related species, *Lucilia illustris* and *Bufolucilia silvarum*, are quite difficult for the beginner to separate. *Phaenicia sericata*, the most common species, is variable in body color, ranging from its usual green to bluish, and occasional specimens have a reddish, "coppery" luster. Together with its closest ally, *Phaenicia pallescens*, it may be distinguished from the remaining species by a whitish pollinosity on the upper surface of the abdomen, especially in the females, and by the separation of the male eyes by a distance equal to or greater than one-tenth the width of the head. *P. pallescens* is a smaller species with body usually bronzy colored, sometimes with greenish luster but never coppery red. It is common in the southern States and is a close relative of *Phaenicia cuprina*, an important pest in Australia and Africa. Both *P. sericata* and *P. pallescens* are primarily urban species, being common in market districts and city dumps.

Phaenicia caeruleiviridis, *Phaenicia eximia*, *Lucilia illustris*, and *Bufolucilia silvarum* agree in that the abdomen is highly shining dorsally, and the eyes of the male are separated by a distance less than one-tenth the width of the head. These species all breed in dead animal matter, except possibly *Bufolucilia*, which is known to to be a parasite of frogs and toads. *P. caeruleiviridis* and *P. eximia*, in contrast to *P. sericata* and *P. pallescens*, are mainly "rural" in their habits, seldom being encountered in city business districts or city dumps. However, they frequently may be taken in residential areas. *P. caeruleiviridis* is widespread east of the Rocky Mountains; *P. eximia* is a neotropical species which occurs in Texas and Louisiana; *L. illustris* and *B. silvarum* are widely distributed in the northern and western States.

Phormia regina and *Protophormia terraenovae* should be recognized without difficulty through their key characteristics. Both species breed in animal matter and occur primarily during the cooler months of spring and fall, or, in the southern limits of their range, in the winter. *P. regina* is deceptively called the "black blowfly," for its body is not black. Both species are of darker coloration than the various species of the *Phaenicia* complex. *P. regina* is usually dark green; *P. terrae-novae* is usually dark blue. Both species are widespread in the Northern Hemisphere. *P. regina* is the more common species, being absent or rare only in the southernmost parts of the United States.

Sarcophaga spp. includes a large group of genera and species of the family Sarcophagidae. These flies vary from three-sixteenths to more than 1 inch in length, and with few exceptions have three dark stripes dorsally on a grayish thorax. Some tropical species are bright yellow with black markings, or even metallic blue or green. The abdomen typically has a "checkered" pollinose pattern of changeable light and dark areas, with genital segments usually reddish but sometimes black. Female sarcophagids deposit living young.

Stomoxys calcitrans, variously called the "stablefly," or "dogfly," or "biting housefly," is a common and very widespread pest of livestock and will bite man freely. It breeds in excrement of herbivores, or in accumulations of vegetable wastes such as piles of grass clippings or seaweed. The elongated, stiff proboscis is characteristic of this species. In repose it projects for a considerable distance in front of the head. In size and general coloration, *Stomoxys* resembles the housefly but is further distinguished from that species by the moderately bent fourth wing vein and by the whitish pollinose spot on the front margin of the thorax.

Two other genera not represented in the key rate mention. *Pollenia rudis* frequently enters houses or attics in large numbers in the fall; for this reason it is called the "clusterfly." Although it keys to *Musca* and *Sarcophaga*, it differs from these flies in having a thorax that is not striped but is partly clothed with crinkly

yellowish hairs, particularly on the sides. The larvae of this species are parasitic on earthworms.

Scopeuma spp. are dung breeding flies which occasionally are common, and which are characterized by dense yellowish hairs and by the slender body. They would key out with *Hylemya*. They occur during the cool months of the year from the Arctic to the southern States.

At times certain other species of flies may appear to be common. It is impossible with limited space to deal with all species which may be encountered, but the species considered here constitute the bulk of the flies commonly associated with man in North America.

NOTE: The writer is extremely interested in the study of *Sarcophaga* flies, and will welcome material from any source. Many of the parasitic species are rarely taken in fly traps, but are more likely to be collected by rearing from host or by general collecting. Some known hosts are grasshoppers, mantids, snails, wasps, bees, caterpillars, spiders or their egg masses, and beetles. Many species breed in carrion or excrement. If flies are obtained by rearing from larvae, the pupal shells should be pinned with the flies, and the host, in the case of parasitic species, should be preserved. Males of some rare species may be found sunning themselves upon rocks or barren ground on hilltops.

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Regional Congenital Heart Program

The fourth regional program to help provide surgical and hospital care for children with congenital heart disease will be located at Johns Hopkins Hospital, Baltimore, where more than 1,200 "blue babies" have been operated on since 1945.

For the past 4 years, the Maryland State Department of Health has administered a small fund for congenital heart surgery for out-of-state children. Inclusion of the State in the regional program will extend and supplement this service to benefit children from the Middle Atlantic and Southern States. In special cases, children may be referred from other parts of the country if the care they need is available only at Johns Hopkins. Full geographic coverage for the country is planned upon completion of the regional heart center program.

Local funds, both public and private, in the State where the child resides, will be used for the major share of the costs. A special grant of the Children's Bureau, Federal Security Agency, may be used when such resources are not available. The grant will also provide convalescent sanatorium care and in-patient hospital care including special nursing and blood transfusions.

Regional programs previously approved are in New Haven, Conn., Chicago, Ill., and in San Francisco and Los Angeles, Calif.

Reported Tuberculosis Morbidity, January–June 1952

Provisional reports from the State health departments indicate there were approximately 56,000 cases of tuberculosis newly reported in the United States during the first 6 months of 1952. This is a slight decline from the numbers reported in the corresponding periods of 1950 and 1951. On the basis of these preliminary data, it is estimated that some 6,000 fewer cases will be reported during the year 1952 than were reported in 1951.

A portion of the decline was due to the application of new case-reporting procedures in 1952. The new procedures limited the kinds of tuberculosis cases which should be reported,

New tuberculosis cases reported, United States and Territories, January–June, 1952

State or Territory	Total newly reported tuberculosis cases	Newly reported group A (active and probably active) tuberculosis cases		State or Territory	Total newly reported tuberculosis cases	Newly reported group A (active and probably active) tuberculosis cases	
		Number	Annual rate per 100,000 population [1]			Number	Annual rate per 100,000 population [1]
Alabama	1,287	675	44.4	New Mexico	570	328	93.2
Arizona	1,852	788	195.8	New York	6,162	5,999	79.8
Arkansas	884	795	83.2	North Carolina	1,106	875	42.3
California	4,423	4,423	80.2	North Dakota	92	86	28.4
Colorado	622	242	35.2	Ohio	3,284	2,452	60.8
Connecticut	725	490	48.1	Oklahoma	698	501	44.2
Delaware	79	56	34.0	Oregon	976	441	56.6
District of Columbia	946	569	140.3	Pennsylvania	2,732	[2]	-------
Florida	1,285	727	49.1	Rhode Island	216	172	43.4
Georgia	1,024	819	47.0	South Carolina	677	524	49.3
Idaho	115	89	30.2	South Dakota	87	52	16.1
Illinois	2,333	2,333	52.9	Tennessee	1,867	918	55.3
Indiana	823	727	36.0	Texas	2,258	[2]	-------
Iowa	348	173	13.2	Utah	74	74	20.9
Kansas	254	247	25.3	Vermont	200	82	44.0
Kentucky	1,270	1,134	77.6	Virginia	2,471	[2]	-------
Louisiana	1,082	[2]	-------	Washington	[2]	[2]	-------
Maine	195	177	39.7	West Virginia	541	510	51.1
Maryland	1,414	1,243	101.8	Wisconsin	714	665	38.3
Massachusetts	1,215	1,121	47.4	Wyoming	50	22	14.9
Michigan	3,075	2,013	61.5				
Minnesota	1,072	433	28.9	State total [3]	56,341	43,777	57.1
Mississippi	599	537	49.0				
Missouri	1,098	1,015	50.2	Alaska	253	211	310.3
Montana	175	127	43.1	Hawaii	304	143	57.5
Nebraska	135	129	19.1	Puerto Rico	3,032	2,668	240.8
Nevada	72	63	73.7				
New Hampshire	116	96	36.0	United States and Territories [3]	59,930	46,799	59.9
New Jersey	2,025	1,285	51.7				

[1] Annual rate, based on population as of July 1, 1951, for States; as of July 1, 1950, for Territories.

[2] Not reported.

[3] Including estimates for States not reporting.

SOURCE: Semiannual tuberculosis morbidity reports (provisional).

and in addition, provided that active and probably active cases should be counted separately from all other cases of tuberculosis.

In accordance with the recommendations of the State directors of tuberculosis control (*Public Health Reports*, October 5, 1951, pp. 1291–1294), State health departments report their new cases in two categories: group A—active and probably active cases; and group B—other reportable cases. This recommended reporting procedure was designed to achieve comparability of data on newly reported cases from State to State and to measure the problem better by identifying presumably infectious cases of tuberculosis needing treatment.

Of the 56,000 new cases reported from January through June 1952, 44,000 were designated as active or probably active cases—an estimated annual reporting rate of 57 per 100,000 population for the continental United States.

The tuberculosis morbidity rate continues to be high in spite of the rapid decline in mortality. This fact lends considerable importance to the numbers of cases newly reported each year as an index of the tuberculosis problem in the United States.

This report was prepared by the Division of Chronic Disease and Tuberculosis, Public Health Service.

Shown in the accompanying table are total cases and group A (active and probably active) cases reported by each State and Territory. An improvement in comparability of data from State to State by the separate reporting of active and probably active cases is readily apparent. Total cases reported by some States (the only figures available in previous years) include only active and probably active cases, whereas totals reported by other States and Territories include cases of more limited clinical significance. As reporting improves, the annual reporting rate of active and probably active tuberculosis cases will no doubt become one of our best measures of the true tuberculosis problem in the various States and Territories.

1950 Census of Mental Patients

According to preliminary information, the number of patients in State and county mental hospitals increased in 1950. At the end of that year, about 600,000 were under supervision in 201 State and 112 county mental hospitals. This compares with more than 580,000 in the previous year. The average rate of all first admissions was 97.3 per 100,000 estimated civilian population.

Based on data compiled from an annual census by the National Institute of Mental Health, Public Health Service, these figures are reported in "Patients in Public Hospitals for the Prolonged Care of the Mentally Ill, 1950."

The National Institute of Mental Health points out that the increase may involve such factors other than an increase in the incidence or prevalence of mental illness as these: growth of the general population, increase in facilities for mental patients, earlier admission of patients through improved diagnostic methods, and hospitalization of patients who were previously untreated.

Industrial Sickness
Absenteeism

Rates for Specific Causes in 1951 and half of 1952

Men and Women 1951

The 1951 rate for sickness and nonindustrial injuries among men (131.2) is 12 percent above the 1950 rate (116.8) and 9 percent above the 10-year mean (120.7). With the exception of the influenza and grippe rate, 1951 rates for specific causes do not differ notably from 1950 rates (see table 1). But 1951 rates for four causes are more than 30 percent above their 10-year means. Cancer is 57 percent above; other diseases of genitourinary system, 41 percent; infectious and parasitic diseases, 37 percent; and hernia, 31 percent. Frequency rates for these are all relatively low, varying from 0.7 for cancer for 1942–51 to 4.8 for other diseases of the genitourinary system for 1951.

The 1951 over-all rate among women (315.1) is 22 percent above the 1950 rate (258.4) and 29 percent above the 10-year mean (244.5). With only a few exceptions, the 1951 rates for specific causes are either approximate to or higher than the corresponding 1950 and 1942–51 rates. Note the increase in rates for influenza and grippe, pneumonia, neurasthenia and the like, and other diseases of genitourinary system.

1942–51

Among men, rates for nonindustrial injuries and the digestive group of diseases were highest in 1951, respectively, 27 and 20 percent above their 10-year means. Among women, 1951 showed the highest rates for all causes, for the respiratory group, and for the nonrespiratory-nondigestive group of diseases. In terms of the 10-year means, the percentage excesses are 29, 35, and 30 percent, respectively.

Frequency by Duration

Frequency rates, shown in table 2, reveal that the rate for women is about twice the rate for men except for absences lasting more than 6 months. Table 2 is derived from the experience of 10 of the reporting organizations which pay benefits for 26 or 52 weeks.

Among both men and women, approximately four-fifths of the respiratory absences and one-half of the nonrespiratory absences lasted less than 1 month. Nonrespiratory diseases accounted for 80 percent of all absences lasting 57 days or longer (30.1 per 1,000 men, and 59.7 per 1,000 women). Twenty percent of the absences were caused by respiratory diseases and nonindustrial injuries combined. During 1951, 7 of every 1,000 men workers and 9 of every 1,000 women workers had an illness lasting more than 6 months. Ten men and 22 women of each 1,000 had an illness lasting from 3 to 6 months.

Days of Disability

Relatively small differences are found in the corresponding disability rates among men dur-

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W. M. Gafafer, D.Sc., continues the quarterly and annual reports on industrial morbidity published in May and September 1952 and in earlier issues. Dr. Gafafer is in charge of the statistical services of the Division of Occupational Health, Bureau of State Services, Public Health Service.

Table 1. Absences per 1,000 persons by cause—sickness and nonindustrial injuries disabling for 8 consecutive days or longer—1951, 1950, and 1942–51 [1]

Cause [2]	Number of absences per 1,000 persons beginning in specified period					
	Males			Females		
	1951	1942–51 [3]	1950	1951	1942–51 [3]	1950
Sickness and nonindustrial injuries	**131.2**	**120.7**	**116.8**	**315.1**	**244.5**	**258.4**
Percent of female rate	42	49	45			
Percent of male rate				240	203	221
Nonindustrial injuries (169–195)	**15.9**	**12.5**	**13.7**	**19.2**	**16.8**	**19.3**
Sickness	**115.3**	**108.2**	**103.1**	**295.9**	**227.7**	**239.1**
Respiratory diseases	**41.7**	**43.3**	**34.1**	**136.7**	**101.1**	**106.1**
Tuberculosis of respiratory system (13)	.6	.7	.5	.5	.5	.2
Influenza, grippe (33)	16.1	16.7	10.9	52.7	34.3	30.7
Bronchitis, acute and chronic (106)	6.2	7.0	5.9	11.1	11.1	11.6
Pneumonia, all forms (107–109)	5.8	5.3	5.4	7.7	4.2	5.4
Diseases of pharynx and tonsils (115b, 115c)	3.6	4.6	3.2	14.8	16.0	13.1
Other respiratory diseases (104, 105, 110–114)	9.4	9.0	8.2	49.9	35.0	45.1
Digestive diseases	**22.3**	**18.6**	**20.1**	**34.6**	**31.1**	**28.5**
Diseases of stomach except cancer (117, 118)	7.0	5.9	6.2	4.5	3.6	3.7
Diarrhea and enteritis (120)	2.9	2.4	2.6	9.6	6.4	7.3
Appendicitis (121)	4.5	4.1	4.1	9.4	11.7	7.2
Hernia (122a)	3.4	2.6	3.1	.2	.6	1.0
Other digestive diseases (115a, 115d, 116, 122b–129)	4.5	3.6	4.1	10.9	8.8	9.3
Nonrespiratory-nondigestive diseases	**48.1**	**42.7**	**45.3**	**117.6**	**90.4**	**100.4**
Infectious and parasitic diseases (1–12, 14–24, 26–29, 31, 32, 34–44) [4]	3.7	2.7	3.0	13.6	7.0	9.8
Cancer, all sites (45–55)	1.1	.7	1.1	.9	.6	1.1
Rheumatism, acute and chronic (58, 59)	3.5	4.5	3.6	4.4	4.4	4.5
Neurasthenia and the like (part of 84d)	1.7	1.9	1.5	16.1	12.3	12.2
Neuralgia, neuritis, sciatica (87b)	2.2	2.6	2.1	2.8	2.9	3.3
Other diseases of nervous system (80–85, 87, except part of 84d, and 87b)	2.1	1.8	2.3	3.4	2.1	3.7
Diseases of heart (90–95)	5.3	4.4	5.4	1.8	2.3	2.3
Diseases of arteries and high blood pressure (96–99, 102)	2.3	2.1	2.3	1.5	1.4	1.6
Other diseases of circulatory system (100, 101, 103)	4.9	4.2	4.8	7.2	6.0	6.7
Nephritis, acute and chronic (130–132)	.4	.4	.4	.4	.4	.3
Other diseases of genitourinary system (133–139)	4.8	3.4	4.2	30.5	21.0	23.5
Diseases of skin (151–153)	3.6	3.5	3.6	4.9	5.5	5.3
Diseases of organs of movement except diseases of joints (156b)	3.6	3.5	3.5	9.7	6.2	7.4
All other diseases (56, 57, 60–79, 88, 89, 154, 155, 156a, 157, 162)	8.9	7.0	7.5	20.4	18.3	18.7
Ill-defined and unknown causes (200)	**3.2**	**3.6**	**3.6**	**7.0**	**5.1**	**4.1**
Average number of persons	173,853	2,301,041	173,881	15,154	212,413	14,113

[1] Industrial injuries and venereal diseases are not included. [2] Numbers in parentheses are disease title numbers from International List of Causes of Death, 1939. [3] Average of the 10 annual rates. [4] Exclusive of influenza and grippe, respiratory tuberculosis, and venereal diseases.

Table 2. Absences [1] per 1,000 persons by duration—sickness and nonindustrial injuries disabling for 8 consecutive days or longer—1951

Duration of absence in calendar days	Sickness and nonindustrial injuries [2]		Nonindustrial injuries		Respiratory diseases		Nonrespiratory diseases [3]	
	Males	Females	Males	Females	Males	Females	Males	Females
	Number of absences per 1,000 persons							
8 days or longer	146.7	302.2	14.8	19.0	49.8	125.8	82.1	157.4
8–28 days	86.9	176.6	8.3	9.7	40.6	99.2	38.0	67.7
29–56 days	29.7	65.9	3.3	5.0	5.7	18.3	20.7	42.6
57–91 days	13.1	29.1	1.7	1.9	1.7	6.0	9.7	21.2
92–183 days	10.0	21.9	1.2	1.7	.9	1.5	7.9	18.7
184 days or longer	7.0	8.7	.3	.7	.9	.8	5.8	7.2
	Number of absences per 1,000 persons (cumulative)							
8 days or longer	146.7	302.2	14.8	19.0	49.8	125.8	82.1	157.4
29 days or longer	59.8	125.6	6.5	9.3	9.2	26.6	44.1	89.7
57 days or longer	30.1	59.7	3.2	4.3	3.5	8.3	23.4	47.1
92 days or longer	17.0	30.6	1.5	2.4	1.8	2.3	13.7	25.9
184 days or longer	7.0	8.7	.3	.7	.9	.8	5.8	7.2

[1] Data from 10 reporting organizations paying benefits for 26 or 52 weeks. [2] Industrial injuries and venereal diseases are not included. [3] Digestive diseases, nonrespiratory-nondigestive diseases and ill-defined and unknown causes are included. Average number of persons: males, 55,853; females, 12,831.

ing 1951 and 1950 (table 3). Table 3 is based on the same population as table 2. In each year, nonrespiratory-nondigestive diseases accounted for one-half of the days of disability per man. Respiratory diseases and digestive diseases each accounted for about the same number of days of disability.

In 1951, women averaged 11.9 days of disability. Compare this with 9.8 in 1950. The excess is explained by an increase in both the frequency and the severity of nonrespiratory-nondigestive diseases (103.8 to 124.6 absences per 1,000, and 48.7 to 53.5 days per absence). If time lost from absences lasting less than 8 days were included, the number of disability days would have increased to approximately 13 per woman and 9 per man.

Men Jan–June 1952

Sickness absenteeism among men workers during the first half of 1952 (table 4) was about the same as in the corresponding 1951 period. In both years, the first quarter rates (170.9 and 168.8) are approximately 40 percent above the corresponding second quarter rates (120.9 and 121.5). Respiratory diseases account for the higher rates in the first quarter.

Note the similarity of the 1952 and 1951 second quarter rates for specific causes. Likewise, the 1952 first quarter rates for specific causes differ little from the 1951 corresponding rates with the exception of influenza and grippe.

NOTE: Data are derived from periodic reports of industrial sick benefit organizations and are limited to sickness and nonindustrial injuries causing absence from work for more than 1 week.

The 1950 annual report on men and women workers and an index of the reports from 1920–50 appeared in *Public Health Reports*, November 23, 1951, pp. 1550–1552.

Table 3. Summary of disability data [1]—sickness and nonindustrial injuries disabling for 8 consecutive days or longer—1951 and 1950

Cause [2]	Males		Females	
	1951	1950	1951	1950
	Number of days of disability per person			
Sickness and nonindustrial injuries	6.4	6.1	11.9	9.8
Nonindustrial injuries	.6	.6	.9	.9
Respiratory diseases	1.3	1.1	2.9	2.5
Digestive diseases	1.2	1.2	1.4	1.4
Nonrespiratory-nondigestive diseases	3.3	3.2	6.7	5.0
	Number of days of disability per absence			
Sickness and nonindustrial injuries	43.7	45.3	39.4	38.0
Nonindustrial injuries	41.9	45.4	45.6	46.2
Respiratory diseases	25.5	25.6	23.4	23.3
Digestive diseases	47.5	49.2	44.1	48.5
Nonrespiratory-nondigestive diseases	58.3	58.4	53.5	48.7
	Number of absences per 1,000 persons			
Sickness and nonindustrial injuries	146.7	133.7	302.2	258.9
Nonindustrial injuries	14.8	13.7	19.0	19.9
Respiratory diseases	49.8	41.2	125.8	106.7
Digestive diseases	25.0	23.5	32.8	28.5
Nonrespiratory-nondigestive diseases	57.1	55.3	124.6	103.8
Average number of persons	55,853	51,327	12,831	10,513

[1] Data from 10 reporting organizations paying benefits for 26 or 52 weeks.
[2] Industrial injuries and venereal diseases are not included. Ill-defined and unknown causes are included in the nonrespiratory-nondigestive diseases.

Table 4. Absences per 1,000 males by cause (annual basis)—sickness and nonindustrial injuries disabling for 8 consecutive days or longer—first and second quarters, 1952 [1]

Cause [2]	Number of absences per 1,000 males beginning in specified period						
	Second quarter		First quarter		First half		
	1952	1951	1952	1951	1952	1951	1947–51
Sickness and nonindustrial injuries	**120.9**	**121.5**	**170.9**	**168.8**	**146.0**	**144.8**	**122.0**
Nonindustrial injuries (169–195)	**14.5**	**14.8**	**16.9**	**15.4**	**15.7**	**15.1**	**12.6**
Sickness	**106.4**	**106.7**	**154.0**	**153.4**	**130.3**	**129.7**	**109.4**
Respiratory diseases	**33.6**	**33.7**	**67.1**	**78.3**	**50.5**	**55.6**	**43.5**
Tuberculosis of respiratory system (13)	.6	.6	.8	.9	.7	.7	.7
Influenza, grippe (33)	10.5	12.1	26.0	39.6	18.3	25.6	17.4
Bronchitis, acute and chronic (106)	4.3	4.4	9.5	10.1	6.9	7.2	6.6
Pneumonia, all forms (107–109)	4.9	5.0	8.6	10.5	6.8	7.7	5.7
Diseases of pharynx and tonsils (115b, 115c)	4.4	3.9	5.3	4.2	4.8	4.1	4.0
Other respiratory diseases (104, 105, 110–114)	8.9	7.7	16.9	13.0	13.0	10.3	9.1

See footnotes at end of table.

Table 4. Absences per 1,000 males by cause (annual basis)—sickness and nonindustrial injuries disabling for 8 consecutive days or longer—first and second quarters, 1952 [1]—Continued

Cause [2]	Number of absences per 1,000 males beginning in specified period						
	Second quarter		First quarter		First half		
	1952	1951	1952	1951	1952	1951	1947–51
Digestive diseases	**22.0**	**22.2**	**26.1**	**21.8**	**24.1**	**22.0**	**18.7**
Diseases of stomach except cancer (117, 118)	6.4	6.9	7.8	6.9	7.1	6.9	5.9
Diarrhea and enteritis (120)	3.1	2.4	3.6	2.9	3.4	2.6	2.3
Appendicitis (121)	4.1	4.8	4.3	4.6	4.2	4.7	3.9
Hernia (122a)	3.5	3.5	4.8	3.0	4.2	3.3	2.8
Other digestive diseases (115a, 115d, 116, 122b–129)	4.9	4.6	5.6	4.4	5.2	4.5	3.8
Nonrespiratory-nondigestive diseases	**48.4**	**47.5**	**57.5**	**50.0**	**52.9**	**48.8**	**43.7**
Infectious and parasitic diseases (1–12, 14–24, 26–29, 31, 32, 34–44) [3]	4.2	3.4	6.9	5.3	5.5	4.3	3.3
Rheumatism, acute and chronic (58, 59)	3.9	3.3	3.9	4.3	3.9	3.8	4.3
Neurasthenia and the like (part of 84d)	1.7	1.8	1.8	1.2	1.7	1.5	1.7
Neuralgia, neuritis, sciatica (87b)	1.9	2.2	2.3	2.2	2.1	2.2	2.4
Other diseases of nervous system (80–85, 87, except part of 84d, and 87b)	2.0	2.1	2.4	2.2	2.2	2.2	1.9
Diseases of heart, arteries, high blood pressure, and nephritis (90–99, 102, 130–132)	6.8	8.1	9.1	9.2	7.9	8.6	7.8
Other diseases of genitourinary system (133–138)	5.0	4.9	5.8	4.9	5.4	4.9	3.7
Diseases of skin (151–153)	4.1	3.4	4.1	3.4	4.1	3.4	3.2
Diseases of organs of movement except diseases of joints (156b)	3.6	3.2	4.3	3.6	4.0	3.4	3.1
All other diseases (45–57, 60–79, 88, 89, 100, 101, 103, 154, 155, 156a, 157, 162)	15.2	15.1	16.9	13.7	16.1	14.5	12.3
Ill-defined and unknown causes (200)	**2.4**	**3.3**	**3.3**	**3.3**	**2.8**	**3.3**	**3.5**
Average number of males	169,435	169,965	171,363	166,670	170,399	168,317	917,010

[1] Industrial injuries and venereal diseases are not included. [2] Numbers in parentheses are disease title numbers from International List of Causes of Death, 1939. [3] Exclusive of influenza and grippe, respiratory tuberculosis, and venereal diseases.

World Health Day

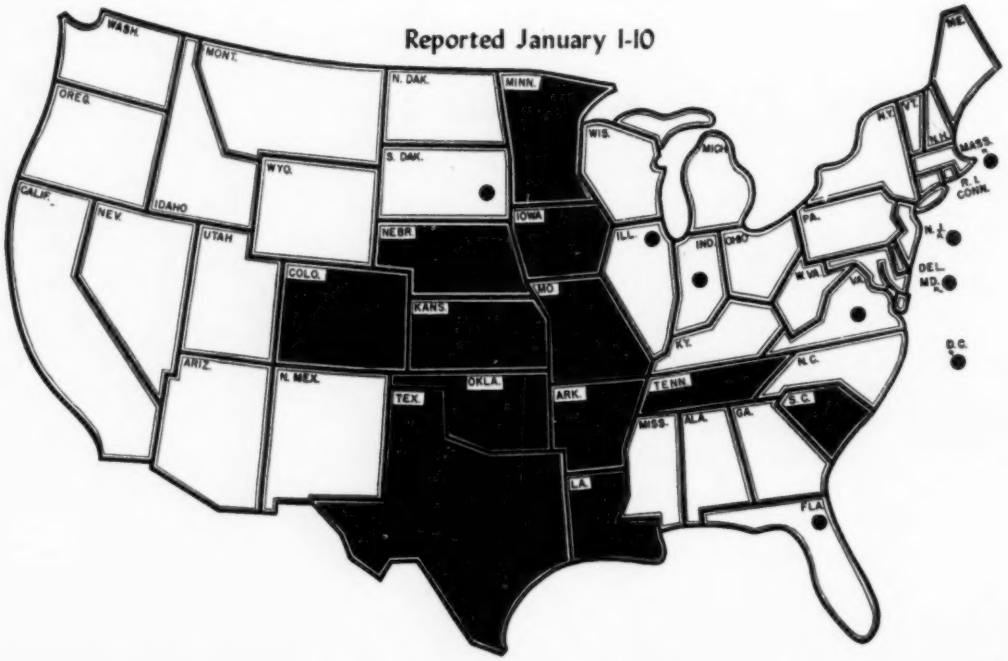
The fifth annual observance of World Health Day will occur on April 7.

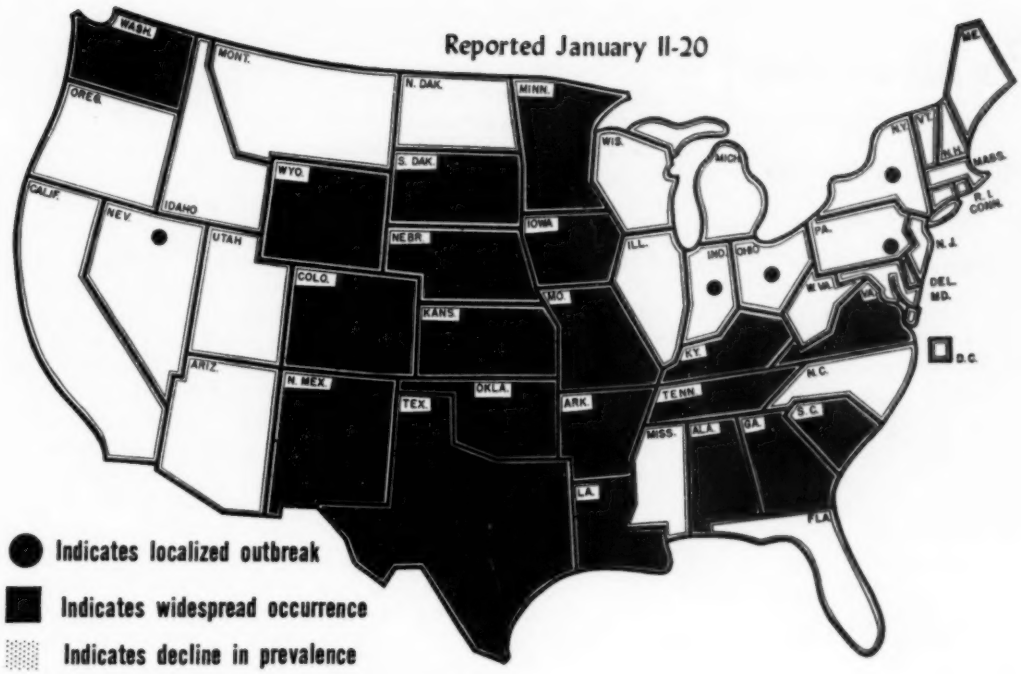
The theme for 1953 "Health is Wealth" is based on the economic value of health, which was emphasized in the discussions at the Fifth World Health Assembly, Geneva, Switzerland, in May 1952. The theme also is the main consideration in the World Health Organization monograph "The Cost of Sickness and the Price of Health," written by Dr. C.-E. A. Winslow, editor of the American Journal of Public Health.

"Every step that can be taken toward lessening the burden of preventable diseases will not only diminish suffering and prolong human life; it will also increase productivity and promote prosperity," Dr. Winslow stated in the monograph.

Influenza Prevalence Trends

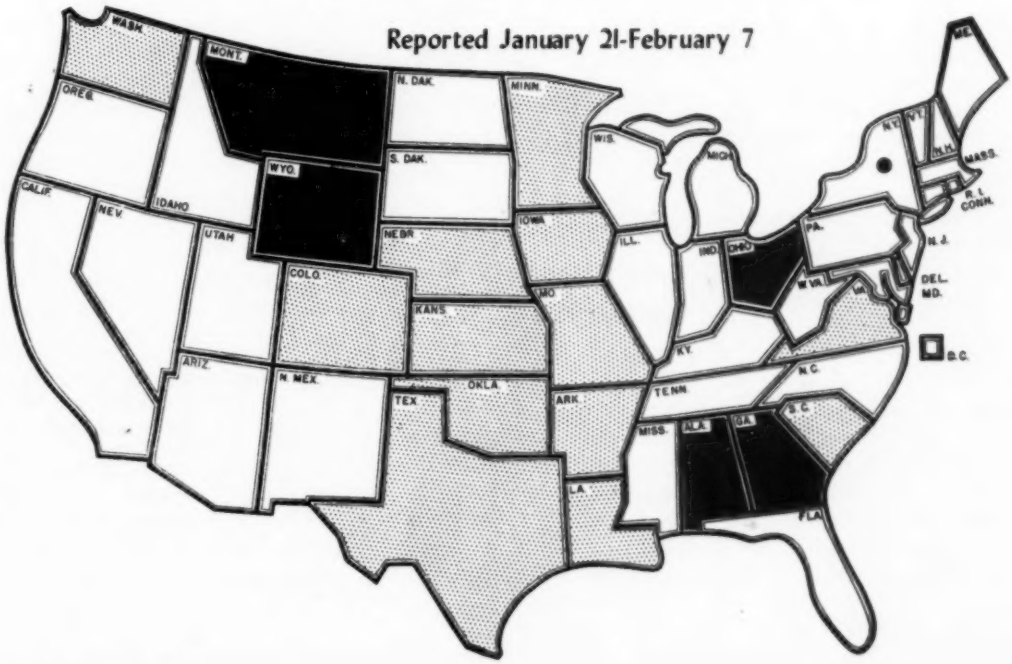
An A-prime type of influenza infection recently has been demonstrated in most parts of the country currently reporting respiratory disease outbreaks. At first infection was mild, with a low complication and a low death rate. Later reports indicated a somewhat higher mortality than usual. Localized outbreaks of respiratory disease began late in December—mainly in Colorado, Missouri, North Carolina, Illinois, Connecticut, and Oklahoma—among civilian, military, and institutional populations. A-prime infections in some of these groups were subsequently confirmed by serologic tests or isolation of the virus.





In the United States, 1952–53

During the first 10 days of January, respiratory disease was widespread in the central part of the country, and localized outbreaks occurred in the eastern part. Widespread outbreaks in some States and localized outbreaks in others continued during the next 10 days. The peak was reached late in January and early in February, though in the central part of the country the trend was already downwards. The true prevalence could not be determined. Some States made no reports, and others were not sufficiently informative to determine the extent of these infections, according to the National Office of Vital Statistics.



PHS publications

Proceedings of the Second Research Conference On Psychosurgery

The First Psychosurgery Conference was held in New York City in 1949 under the auspices of the National Institute of Mental Health, Public Health Service. Chaired by Dr. Fred A. Mettler of Columbia University, it devoted its attention to the criteria for the selection of psychotic patients for psychosurgery, such as topectomy, lobotomy, and gyrectomy.

The second conference, held in 1950, under Dr. Mettler's chairmanship, had as its theme the determination of the effects of psychosurgery and their measurement. The 2-day session covered such subjects as rating scales for psychotic patients, base-line data and psychiatric categories, evaluating the environmental situation of the mentally ill patient, and the study of affectivity, deterioration, regression, and creativity in patients following psychosurgery.

Among the points brought out by the discussants and presented in this publication was the need for a new approach to psychiatric categories, with the possibility of tying in some psychiatric subcategories to physiologic circumstances with resultant profit to psychiatric nomenclature. It was agreed that the scales presented were useful and well constructed, but "the psychiatrist himself still remains the most sensitive measuring instrument."

The viewpoint was presented that there is a "basic schizophrenia" underlying the schizophrenic psychosis; and that psychosurgery does not alter the basic disease process, but by relieving the stress of conflicting memories it may lessen the precipitating factors of the psychotic process.

Since depressed patients constitute another considerable group of patients for whom psychosurgery is considered, affectivity was discussed. In this respect many problems were raised, for example, the relationship of anxiety to other affective responses; whether psychosurgery alters the affective states by inhibiting or facilitating activity and emotional expression; and whether it alters unconscious processes.

An analysis of creativity enumerated the four underlying abilities of that faculty as imagination, skill, problem-solving ability, and zeal. It was pointed out that the creative capacity is seldom up to the preoperative level in psychosurgical patients, but by reducing anguish the operation may actually be followed by a rise in the level of creative ability.

Discussion also concerned the fact that all treatment procedures are aimed at the restoration of the patient to community life. A rating scale of family situations was presented as a measure of the degrees of stress in the situation to which the patient is exposed in the home. It was emphasized that for the patient who is returned to the community, the supportive attitude of the family is far more important than the physical environment. In like manner, the hospital adjustment of the patient is not necessarily a good index of his adjustment in a home situation which calls for self-direction.

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Proceedings of the Second Research Conference on Psychosurgery. (Public Health Service Publication No. 156) 1952. 116 pages. 75 cents.

Salaries of Local Public Health Workers April 1952

This study is the fourth in a series on salaries of selected public health workers begun in May 1948, in cooperation with the Association of State and Territorial Health Officers and the American Public Health Association. It contains information from 483 local health units, 303 local nonofficial health agencies, and 191 local boards of education. Data on public health nurses in the last two groups, usually published in supplements, were obtained and tabulated independently by the National Organization of Public Health Nursing and incorporated in this report for the first time.

The current study covers a wider range of professional classifications than was used in the three previous studies and includes for the first time data from health units serving populations of from 250,000 to 499,999 and 500,000 and over.

The data indicate that salaries of local public health workers in units serving areas of from 50,000 to 249,999 population advanced only moderately between April 1950 and April 1952. The greatest increase (27 percent) came to laboratory workers. Progressively smaller percentage increases were recorded for nurses, sanitary engineers, health officers, and sanitarians. Median salary intervals for those professional groups were (in dollars); health officers, 8400–8599; other public health physicians, 7000–7199; sanitary engineers, 5000–5199; supervising public health nurses, 4000–4099; professional laboratory workers, 3800–3999; sanitarians, 3200–3399; staff public health nurses, 3000–3099.

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Salaries of Local Public Health Workers, April 1952. (Public Health Service Publication No. 237) 1952. 83 pages; tables, charts. A limited number of copies available from the Division of State Grants, Public Health Service, Washington 25, D. C.

Publications for which prices are quoted are for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Orders should be accompanied by cash, check, or money order and should fully identify the publication (including its Public Health Service publication number). Single copies of most Public Health Service publications can be obtained without charge from the Public Inquiries Branch, Public Health Service, Washington 25, D. C.